THE AMERICAN
JOURNAL OF PHARMACY

JANUARY, 1878.

LABORATORY NOTES ON FLUID EXTRACT OF CIMICIFUGA.

BY J. U. LLOYD, Cincinnati, O.

The Pharmacopœia directs to make this extract with stronger alcohol. I will not in the present article report any of my experiments with different menstruums; this paper can embrace only a few investigations without being longer than I desire it to be, consequently I select those in which I operated upon small amounts of material, as such correspond with the requirements of the Pharmacopœia. They were instituted and form the part of a series intended to instruct me for my laboratory work, so that I could as nearly as possible understand the comparative value of the processes which have from time to time been recommended for the preparation of fluid extracts. I assume that the menstruum directed by the U. S. P. is capable of completely extracting the principles which give to dry cimicifuga its therapeutical value. It may not be out of place to say that my experience teaches me that either water or glycerin injures the fluid extract of this drug. I also assume, in the part of the line of experiments which are embraced by this paper, that every grain of dry extractive matter has the same therapeutic value; that one grain of dry extractive matter taken from the first part of a percolate will produce the physiological action of a grain from any other portion. This, to an extent, may be inaccurate; the principle will not, I believe, hold good for articles like cinchona, hydrastis, and even podophyllum; but with such the relative values of different processes of percolation may be quite correctly determined by comparing the amounts of extractive matter at similar stages of each operation, providing the strength of the menstruum is not changed.

My experience is that I save time by instituting parallel examples of

each experiment, and generally carry on three, unless very large amounts are being worked; thus an error at any point in one of the experiments, or the neglect to secure a percolate at the proper time, will not cause the loss of time necessitated by the repetition of an extended experiment.

It is necessary, for proper comparison, to use material of the same quality throughout the entire operation. This point I always endeavor to provide for by supplying myself with an abundance before commencing. For these experiments I directed that 1,000 pounds of crude cimicifuga root be taken from a large pile, just as it came. I object to selecting a superior quality, as my aim is to experiment with such as is found upon the market, and we may expect the majority afterward to operate with. One-half of the thousand pounds was powdered in a chaser; the other half was coarselv ground.

In evaporating percolates, I find it almost impossible to work large amounts with any degree of satisfaction. A skim usually forms over the surface, which frequently almost completely prevents evaporation from beneath; from eight to ten days it may be expected will be required when this is the case, and even then all the liquid may not be driven off. The addition of a known amount of dry sand facilitates the operation; but I seldom use this plan, as frequently the residuum is to be examined, and the sand interferes. I favor moderately small portions of liquid, and in the experiments recorded here the second part of the first is the only example where more than one cubic centimeter was evaporated. Great care must be taken to expel all the alcohol from residuums, but too great a heat must be guarded against with an equal degree of caution. All extractive matters are not like that obtained from cimicifuga. A heat of 150° to 160° Fah. is sufficient for this article. I obtain the requisite temperature from a steam-coil drying-room; cold air passes over the coil of pipes at the bottom of the room, and, circulating around alternate ends and over the shelves, escapes at the top.

I take three equal amounts of each percolate; if there is sufficient variation to justify, I average the weight of the residuums. Mistakes may be very easily made, and often it is a satisfaction to have duplicates, especially where the result is contrary to preformed opinions.

For a base to compare with in this line of experiments I sought to find the amount of dry alcoholic extract a given number of grains of

cimicifuga contained. A half-inch glass tube was drawn at the bottom like a syringe, and plugged with a wad of cotton. 438 grains of powdered cimicifuga was moistened with alcohol, and carefully and firmly pressed into the tube; the powder was covered with a closely fitting paper, and alcohol added from a self-regulating supply-vessel until 112 fluidounces had passed.

One cc., carefully evaporated in watch glass, gave . . .	·018 grain
Total yield of 112 fluidounces, ...	59·51 "

The powder was removed from the tube, dried, rubbed in a mortar, and again moistened with alcohol and replaced in the tube; alcohol supplied until 64 fluidounces had passed.

One fluid dram yielded ·01 grain dry extract.

Total yield of 64 fluidounces, ...	5·12 grains
Total amount extracted from 438 grains of powdered cimicifuga by 176 fluidounces of alcohol, ...	64·63 "
One troyounce will contain	70·83 "
7680 grains (16 troyounces), ...	1133·26 "

About 14½ per cent.

The extraction of the resin from the powder may not have been absolute, but I think the operation was carried as far as could be desired. The first percolate, 112 fluidounces, was deep straw-color, the second very light.

I assume that if a fluid extract of cimicifuga represents the amount of powder employed, each portion of 16 fluidounces will contain 1133·26 grains of dry extractive matter, soluble in strong alcohol, and the ratio between the number of grains actually contained and 1133·26 represents the value of the fluid extract as compared with what it should be.

Experiment 1, *U. S. P.*—7,680 grains powdered cimicifuga, properly moistened and pressed into a cylindrical tube, three inches internal diameter, filled it ten inches in height. I had ten tubes constructed, of such diameter that the first would allow 7,680 grains to stand fifteen inches high; the second required twice 7,680 grains; the third three times 7,680, and so on until the tenth required ten times 7,680, the powder in each of the ten percolators occupying fifteen inches in height. The tubes were thirty-six inches long. To arrive at these sizes, I calculated the number of cubic inches the tube three inches in diameter and ten inches long contained (70·68), and from these known terms arrived at the diameter of the percolators (see tables).

Moveable diaphragms were made of perforated tin; they were covered with muslin and so arranged as to rest at the bottom of each tube, nicely fitting into each. A round piece of filtering-paper was placed over them. Below the diaphragms the percolators tapered, funnel-shaped, to a small tube, where was attached a stop-cock. Commencing at the smallest, the ten percolators were arranged, in natural order, in a frame.

7,680 grains of powdered cimicifuga was moistened with 4 fluidounces of strong alcohol, and pressed into the smallest percolator; the powder occupied 15 inches in height. The operation was repeated until 7,680 grains had been pressed into each of the ten, the powder being made to occupy a proportional less height as the diameter of the percolator increased. To reduce the powders to the height desired, I used cylindrical boards which accurately fitted each percolator, they were attached to graduated handles. Circular papers were placed over each powder, and held in place with pieces of perforated tin. The remainder of 16 fluidounces of alcohol was then poured upon each powder, the percolators covered with panes of glass and allowed to macerate four days. At the end of this time no liquid appeard at the exit tube of any percolator. 33 fluidounces of alcohol were then added (16 troyounces of powdered cimicifuga will absorb and hold from 24 to 25 fluidounces alcohol).

TABLE 1.

Amount of powder in each percolator.	Diameter of percolator.	Height of powder.	Am't of dry ext've matter cont'd in 1 cc. of the percolate, 14 floz.	Total amount of extractive matt'r in 14 floz.	Amount of dry extractive matter cont'd in 1 cc. of the percolate, 10 floz.	Total dry extractive matter in 10 floz. percolate.	Total am't of dry extractive matt'r in the finished fluid extract.	Finished fluid extract represents powdered Cimicifuga.
Grains.	Inches.	Inches.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.
7680	2.45	15.	1.41	582.72	.18	53.14	635.86	4309.16
7680	3.46	7.5	1.25	516.60	.42	123.98	640.58	4341.15
7680	4.24	5.	.85	351.29	.76	224.35	575.64	3901.06
7680	4.90	3.75	.75	309.96	.66	194.83	504.79	3420.92
7680	5.84	3.	.81	334.76	.35	162.36	497.12	3368.94
7680	6.	2.5	.70	289.30	.53	156.46	445.76	3020.82
7680	6.48	2.14	.62	256.23	.66	194.83	451.06	3056.79
7680	6.93	1.88	.85	351.29	.53	156.46	507.75	3440.98
7680	7.35	1.67	.57	235.57	.44	129.89	365.46	2476.67
7680	7.75	1.5	.86	355.42	.42	123.98	479.40	3248.85
76800				3583.14		1520.28	5103.42	34585.34

Percolators 6, 7, 8 and 9 allowed the alcohol to run directly through until from 4 to 8 fluidounces had passed, it was uncolored, then the flow slackened and the percolate became dark. I regulated the dropping and returned the alcohol which had passed, this last I had no authority for doing as our direction is positive to percolate 24 fluidounces and reserve the first 14. The operation was finished as the Pharmacopœia directs. See table No. 1.

Recapitulation.—According to the Pharmacopœia the powders are to remain in the percolators four days to macerate, but 16 fluidounces of alcohol are used, and the reading of the general directions leads me to expect a percolate will appear. This is not the case, however, 16 troyounces of powdered cimicifuga will absorb and hold 24 or 25 fluidounces of alcohol; to remedy this discrepancy the alcohol must be increased to at least 24 fluidounces. At the end of four days I carefully removed the tin and papers, the powders were found filled with numerous fissures from a mere fracture to one-eighth of an inch in diameter, in every case the powder had contracted and separated from the side of the percolators; they were not in a condition to percolate satisfactorily, but my object was to follow the process of the Pharmacopœia, and, after replacing the papers, I proceeded with the operation according to directions. By refering to the table it will be seen that the most successful pint of fluid extract represents nearly 9 troyounces of cimicifuga, the poorest a fraction over 5 troyounces. As regards the directions given in the U. S. P, I believe in all instances, except that mentioned which *favored* the extract, they were followed exactly; true, it may be said, a good pharmacist will not be likely to use a percolator 7·35 inches in diamater to work 16 troyounces of cimicifuga in, and, yet as the Pharmacopœia does not mention the diameter of the percolator to be employed, it might be answered that the diameter of the percolator is likely not a consideration of much importance else it would be named—that each of the extracts found in table No. 1 are official fluid extracts, inasmuch, as the requirements of the Pharmacopœia were met in the preparation of them all, and that an official fluid extract of cimicifuga may contain the virtues of from 5 to 9 troyounces of cimicifuga in 16 fluidounces of the fluid extract.

It will be seen that the first three percolators produced extracts which contained more extractive matter than any of the others, but the second contains more than the first, which is rather an exceptional

example. From the fifth there was no regularity, the difference in the height of the powders did not influence the result; indeed, the tenth percolator furnished an extract stronger than the sixth. This irregularity, to the greater extent, resulted from the cracks in the powder, which were caused by the four days' maceration with an insufficient amount of alcohol, when fissures form or the mass of the powder contracts and separates from the percolator; the menstruum, when added, passes through the crevices instead of permeating the material. This was particularly evident in percolators 6, 7, 8 and 9, where the alcohol run at once in an uncolored stream. My experience is that the powder should be kept covered with liquid from the commencement until the end of the process. There will be no greater loss of alcohol from evaporation if the entire amount to be used is added at the commencement. Extent of surface controls evaporation, and increase of bulk will not increase the surface if the percolator is cylindrical. Now, as 16 troyounces of cimicifuga will absorb 24 fluidounces of alcohol, and 24 fluidounces of percolate are to be obtained, it follows that the word forty-eight, substituted for sixteen in the official directions for making the fluid extract of this article, would make the percolate appear from the exit, as the wording of the directions leads us to anticipate, would prevent the formation of crevices, would add at one time sufficient alcohol to furnish both the percolates, and would not increase the expense. I will pass on now, and briefly notice experiment No. 2, differing from this only in the fact that the powders were not macerated.

Experiment 2.—The same percolators were prepared; 7,680 grains of powdered cimicifuga were moistened with 4 fluid ounces of alcohol. This amount was placed in each of the ten percolators, pressed until it occupied the same height as in the corresponding percolators of previous experiment, and covered in like manner with circular papers. Forty-four fluidounces of alcohol were added to each, and percolation proceeded with at once. The percolate from each was collected in portions of 14 and 10 fluidounces, after which the fluid extract was finished as the Pharmacopœia directs. See table 2.

Recapitulation.—In this series no cracks formed in the powders. The first percolator gave the largest total yield of extractive matter, representing about 11⅓ troyounces of cimicifuga. The ninth contained a little more than enough to represent seven. Compared with the preceeding table, there is a decided increase in the value of each extract,

with one exception, the eighth, where, by a somewhat remarkable coincidence, corresponding percolates contain the same amount of extractive matter. There is a rapid decrease in the value of the extracts from the first to the seventh, beyond which the diameter of the percolator does not influence the result. The seventh, with a height of powder 2·14 inches, furnishes an extract inferior to the tenth with only 1·5 inches; indeed, this last is superior to any above it, until the sixth is reached. It will be remembered that in my comments upon the first table I imputed this (much larger) irregularity to be mainly due to the fissures in the powder, caused by the process of maceration. There are other causes why a powder of little depth cannot be exhausted with any degree of certainty—causes which I believe the most careful cannot easily overcome, or sufficient usually to about counterbalance the advantage accruing from so slight an increase of depth as there was between the powders in each of the latter five percolators. I believe these variations in every case are governed by natural laws, which I cannot dwell upon just now. The ten pints of finished fluid extracts contained a total of 41965·88 grains extractive matter an average of 8·7 troyounces to the pint. The extracts from table No. 1 represented only 7·2 troyounces, being a difference of 21 per cent. in favor of percolation without maceration. Taking the first percolator of each table, the difference is 30 per cent. in favor of percolation without maceration.

TABLE 2.

Amount of powdered Cimicifuga in each percolator.	Diameter of percolator.	Height of powder.	Am't of dry ext've matter cont'd in 1 cc. of the percolate, 14 floz.	Total dry extractive matter in 14 floz.	Amount of dry extractive matter cont'd in 1 cc. of the percolate, 10 floz.	To'l extract'e matter contained in percolate, 10 floz.	Total extractive matter contained in the finished fluid extract.	Finished fluid extract represents powdered Cimicifuga.
Grains.	Inches.	Inches.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.
7680	2·45	15·	1·67	690·18	·46	135·79	825 97	5597·52
7680	3·46	7·5	1·52	628 19	·44	129·89	758·08	5137·44
7680	4·24	5·	1·22	504·20	·60	177·12	681.32	4617·24
7680	4 90	3·75	1·19	491·80	·57	168·26	660·06	4473·17
7680	5·48	3·	1·17	483·54	·55	162·36	645·90	4377·21
7680	6·	2·5	1·10	454·61	·42	123 98	578·59	3921·05
7680	6·48	2·14	·83	343·02	·49	144·65	487 67	3304·90
7680	5·93	1·88	·85	351·29	·53	156·46	507·75	3440·98
7680	7·35	1·67	·99	367·60	·47	138·74	506·34	3431·42
7680	7·75	1·5	·83	343·02	·67	197·78	540·80	3664·95
76800				4657·45		1535·03	6192·48	41965·88

I come now to the third experiment, where the plan recommended in the U. S. D., page 1164 (note), for cinchona was applied to cimicifuga, the operation being suspended when the official amount of percolate was obtained.

Experiment 3.—Ten portions, each 7,680 grains of powdered cimicifuga, were intimately mixed, each separately, with 32 fluidounces of alcohol, and allowed to macerate 30 minutes, when each portion was transferred to a percolator—the ten percolators being those before used. When the liquid disappeared below the surface of the powder, alcohol was added until a sufficient amount of percolate had been obtained, said percolates being reserved in portions each of 14 and 10 fluidounces. The fluid extract was completed according to the directions of the U. S. P. See table 3.

TABLE 3.

Amount of powder in each percolator.	Height of powder in each percolator.	Diameter of percolator.	Am't of dry extr't contained in 1 cc. of the percolate, 14 floz.	Total extract in 14 floz.	Am't of dry extr't contained in 1 cc. of the percolate, 10 floz.	Total dry extract in 10 floz.	Total am't of dry extractive matt'r in the finished fluid extract.	Finished fluid extract represents powdered Cimicifuga.
Grains.	Inches.	Inches.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.
7680	15.	2.45	.72	297.56	.74	218.45	516.01	3496.85
7680	7 5	3.46	.71	293.43	.70	206.64	500.07	3388 93
7680	5.	4.24	.76	314 09	.52	153 50	467.59	3168 81
7680	3.75	4.90	.66	272.76	.50	147 60	420.36	2848.74
7680	3.	5.48	.71	293.43	.57	168.26	461.69	3128.83
7680	2.5	6.	.64	264.50	.59	174.17	438 67	2972.83
7680	2 14	6.48	.68	281.03	.58	171.22	452.25	3064.86
7680	1.88	6 93	.70	289.30	.60	177.12	466.42	3160.89
7680	1.67	7.35	.74	305.83	.52	153.50	459.33	3112.84
7680	1.5	7.75	63	260.37	.48	141.70	402.07	2724.79
76800				2872.30		1712 16	4584.46	3:068.37

Although the maceration is continued only 30 minutes, it strikes me the process may better be called percolation with maceration, than that of the U. S. P. A marked peculiarity of the result of the ten experiments is the regular amount of extractive matter contained in the fluid extracts; but while there is more certainty as to the regularity of the extracts made by this method, judging from these experiments, each

extract is, with one exception, inferior to the corresponding extract in the former tables. The total amount of cimicifuga represented is 3516·97 grains less than represented by the U. S. P. process, and 10897·51 grains less than by simple percolation. The average of the ten pints makes each 16 fluidounces of fluid extract represent 6·5 troy-ounces of cimicifuga, which is 34 per cent. in favor of percolation without maceration, as represented by the second experiment, One very great objection to the process just described arises from the fact that the powders settle in a tough mass, so compact as to almost prevent the passage of the alcohol; percolator No. 1 with a diameter of 2·45 inches requires considerable pressure when the moistened powder is made to occupy 15 inches in height. But by this process the powder settles until it occupies only 11 inches. Indeed, with this percolator the liquid ceased to drop at all, and I was compelled to stir the powder with a spatula. It will be remembered that this operation was discontinued when the amount of percolate directed by the official formula for fluid extracts was obtained. I will now call attention to the following experiment, where the entire process recommended for solid extract of cinchona, as I understand it, was applied to cimicifuga.

3,840 grains of powdered cimicifuga were mixed with 16 fluidounces of alcohol, allowed to stand 30 minutes, and poured into an ordinary glass percolator, diameter of top 10 inches, bottom 1½ inches. When the liquid disappeared below the surface of the powder alcohol was added, until the total amount of percolate desired (56 f℥) was obtained in fractions, as explained by table 4.

3,840 grains of powdered cimicifuga was mixed with the first percolate (16 f℥) from the preceding fraction, allowed to stand 30 minutes, and poured into a percolator similar to the preceding. When the liquid disappeared beneath the surface of the powder it was followed with the succeeding percolates in the order they were obtained, each being permitted to disappear before the following one was added; finally, the operation was completed with alcohol. The percolates were reserved in portions, as explained by table 4, until 60 fluid ounces were obtained. The first percolate (16 f℥) of the preceding operation was mixed with a third portion of 3,840 grains of powdered cimicifuga, allowed to macerate 30 minutes, and poured into a percolator like those used in the preceding examples. This was followed with the remainder of the percolates, the result being also separated, as obtained, into

fractions—see table 4. Towards the last, alcohol was added to obtain the requisite amount. The first two fractions were mixed and reserved, the remaining were mixed and evaporated until reduced to 3 fluidounces, then added to the reserved 21 fluidounces. See table 4.

TABLE 4.

Percolate from first 8 oz. powdered Cimicifuga.	Dry extract contained.	Percolate from 2d 8 oz. powdered Cimicifuga.	Dry extract contained.	Percolate from 3d 8 oz. powdered Cimicifuga.	Dry extract contained.	Extractive matter contained in 16 floz. finished fld. extract.
Fluid oz.	Grains.	Fluid oz.	Grains.	Fluid oz.	Grains.	Grains.
16	393·88	16	760·43	16	767.76	
8	54·20	8	76·75	5	109·22	
8	30·66	8	49·58	8	80·29	
8	25·60	8	47·22	8	49·59	
8	19·20	8	43·68	8	47·50	
8	17·28	8	41·32	8	45·41	
		4	17·12	8	38·96	
				7	30·99	
56	540 82	60	1036·10	68	1169 72	778·48

Recapitulation.—The 56 fluidounces of percolate obtained from the first 8 troyounces of powder contained 540·82 grains of dry extractive matter. This percolate with the extractive matter contained was passed through the second portion of powder (8 troy ounces), being followed with enough fresh alcohol to make 60 fluidounces, containing a total of 1036·10 grains of dry extractive matter. Deducting that derived from the first portion of powder leaves us 495·28 grains as the result of the second operation. The third 8 troyounces of powder was percolated with a menstruum already containing 1036·10 grains of extractive matter. Fresh alcohol enough was added to produce 68 fluidounces of percolate, which contained 1167·72 grains of extract, deducting that obtained from the 16 ounces of powder of the two former operations leaves 131·62 grains. Sixteen fluidounces of the finished fluid extract contained 778·48 grains; of this, 665·77 grains were con-

tained in the first 24 fluidounces of percolate, consequently 44 fluidounces of alcohol were required to extract 112·71 grains of extractive matter.

This operation I found very tedious and troublesome. As mentioned in connection with experiment third, cimicifuga settles into a tough mass when worked in this way, so compact as almost to prevent the menstruum from passing. More than three weeks were consumed in preparing this 24 fluidounces of fluid extract. I gave the experiment every attention possible for me to spare from other operations. I stationed a boy part of the time to reserve the percolates, and with all my care occasionally the surface of the powder would become exposed and crack. Necessarily, I was compelled to suspend the operation nights and upon the sabbath.

TABLE 5.

Percolate from 24 oz. powdered Cimicifuga.	Dry extract contained.	Extractive mattercontained in 16 floz. finished fluid extract.
Fluid ounces.	Grains.	Grains.
16	805·08	
5	134·30	
8	89·76	
8	55·52	
8	43·68	
8	41·36	
8	40·16	
7	26·88	
68	1236·74	824·46

When this line of experiments was commenced I also instituted an example with simple percolation, corresponding excepting that the powder was placed in a single percolator. The percolate was received in similar portions; table No. 5 tabulates the result. Comparing the two operations I find that simple percolation extracted 69·02 grains of extractive matter more than repercolation. In the first thirty-six fluidounces, corresponding with the amount of percolate derived from 24 troy-

ounces of powder by the official process, repercolation falls 79·66 grains short of simple percolation; this will make sixteen fluidounces of fluid extract by repercolation, lack 53·11 grains of the simple percolation, equivalent to 359·01 grains of cimicifuga. Repercolation represents nearly 9½ troyounces of cimicifuga; percolation about 10 troyounces, being 5 per cent. in favor of simple percolation. These experiments can only compare repercolation and percolation by this (to me) unsatisfactory process. The theory of repercolation, as I understand it now, presents quite a different aspect. I will introduce two similar experiments, intended to compare percolation and repercolation; both were instituted at the same time, both had the same total height of powder, and to both I gave all the care possible.

Repercolation.—3,840 grains of powdered cimicifuga were moistened with 2 fluidounces of alcohol and pressed into a cylindrical percolator three inches in diameter until the powder occupied 5 inches in height. It was covered with a circular paper, held in place with a perforated piece of tin, and 35 fluidounces of alcohol added. The percolate was separated as it passed into portions of 6, 3, 4½ and 9 fluidounces. The first, 6f℥, was reserved.

TABLE 6. *Result of Experiments by Repercolation.*

Amount of powder operated upon.	Amount of percolate.	Amount of dry extractive matter in 1 cc.	Total amount of extractive matter in each percolate.	16 floz. of finished fluid extract	
				contain dry extract.	represent powd'd Cimicifuga.
8 oz.	6· f℥	1·57 gr.	278·08 grs.		
8	7·5	1·32	292 25		
8	10 5	1·30	402·95		
24	24·		973 28	648·85 grs.	4397·20 grs.

3,840 grains of powdered cimicifuga were moistened with the second portion of the percolate (3f℥) from the last powder. It was pressed into a three inch percolator until it occupied five inches, and was then covered with paper like the last, and the two remaining fractions of the percolates added in the order they came. The first (4½f℥) being permitted to disappear before it was followed with the other. Alcohol was

finally added until the desired amount of percolate was obtained. This was divided as it came into three portions, 7½, 4½ and 4½ fluidounces. The first, 7½, was reserved.

3,840 grains of powdered cimicifuga were moistened with 2 fluidounces of the second percolate obtained in the preceding operation; pressed into a three inch percolator until it occupied five inches in height. The remainder of the 4½ fluidounces of percolate was added, allowed to disappear, followed with the last percolate, 4½f℥, and then at once with alcohol. Ten and a half fluidounces of percolate were obtained; this and the two reserved percolates were mixed together, representing 24 fluidounces of the fluid extract of cimicifuga made by the repercolation process. Table No. 6 shows the result.

Simple Percolation.—24 troyounces of powdered cimicifuga were moistened with 6 fluidounces of alcohol, and pressed into a three inch cylindrical percolator until it occupied 15 inches in height. After being covered with a circular piece of filter paper, 60 fluidounces of alcohol were added and percolation continued until 24 fluidounces of percolate were obtained; this was reserved in three fractions to correspond with the three reserved percolates of the repercolation proccess. Table No. 7 places the result where the two processes can be compared.

TABLE 7. *Result of Experiments by Percolation.*

Amount of powder operated upon.	Amount of percolate.	Amount of dry extractive matter in 1 cc.	Total amount of extractive matter in each percolate.	16 floz. of finished fluid extract	
				in 1 cc.	represent powd'd Cimicifuga.
24 oz. powder	10·5 f℥	1·96 gr.	607·52 grs.		
The same powder	7·5	1·38	305·55		
The same powder	6	·93	164·72		
	24·		1077·79	718·51 grs.	4869·28 grs.

Recapitulation.—The total amount of extractive matter obtained by the repercolation process was 973·28 grains, by simple percolation 1077·79, being an excess in favor of simple percolation of 104·51 grains, which represented 708·25 grains of cimicifuga. Sixteen fluidounces of the finished fluid extract represented near 9 troyounces of cimicifuga

by the repercolation process, and 10 by simple percolation, being a difference of 11 per cent. in favor of simple percolation.

10½ fluidounces of percolate, the third reserved portion by repercolation, I represent as corresponding with the first percolate—simple percolation—because this is the only fraction which passes through the entire 24 troyounces of powder by the repercolation process, but it should be remembered that 16 troyounces have been submitted to the action of two previously reserved portions, consequently it must not be expected that an equal amount of matter will be extracted by the two percolates, and a comparison of results shows that the repercolation fraction contains less than percolation by 204.57 grains. The second percolate, 7½ fluidounces, passes in the repercolation process through 8 troyounces of powder, which have not been submitted to the action of any previous percolate, also through 8 troyounces, which have been partly extracted by the reserved percolate (6f℥). The corresponding fraction in simple percolation passes through 24 ounces of cimicifuga, all of which has been partly exhausted by the preceding percolate, the result shows us that this fraction contains 13·30 grains more extractive matter in the simple percolation process.

The other reserved portion, 6 fluidounces, is the first by the repercolation process, and is actually simple percolation where the first 6 fluidounces of a percolate, from 8 troyounces of cimicifuga, are reserved. By simple percolation the corresponding percolate is the last, and passes through 24 troyounces of cimicifuga, which have been depleted to a large extent of soluble materials by the action of two preceding percolates, (reserved as two). It is seen that this percolate contains 113·36 grains less by simple peercolation than by repercolation, but the excess of extractive matter contained in the first two portions, in favor of simple percolation, makes the total result 104.51 grains in favor of that process.

In the preceding, I have illustrated, by seven tables, my experience with four different processes for making fluid extract of cimicifuga, embracing 34 experiments. The following table (No. 8) gives the value of the best fluid extract of each process.

TABLE 8.

Taken from Table	16 fluidounces of fluid extract made by	Represents dry extractive matter.	Represents grains of Cimicifuga.	Or of the total am't of extract in the root, taken as the unit.
No. 2	Percolation without maceration	825·97 grs.	5597·52 grs.	·730
" 6	Repercolation	648·85	4397·20	·573
1	U. S. P.	640·58	4341·15	·565
3	U. S D Page 1164 (note)	516·01	3496·85	·455

None of the experiments produced with the official amount of alcohol, an extract to represent the powder, operated upon. To arrive at any certainty, many times this number of disinterested investigations must be put upon the official fluid extracts. The result of the line I offer, unmistakably favors simple percolation *without maceration;* but fluid extract of cimicifuga may possibly be exceptional, and it would not be well for those who have not experimented farther to prepossess themselves in favor of any theory from the summing up of the few experiments I offer in this paper. Of primary importance, to pharmacists, is the question, "can we practically produce a liquid extract each fluidounce of which will contain the medicinal principles of one troyounce of crude material, on operating with such quantities as the U. S. P. directs?"

ON A DISTILLATORY APPARATUS.

By Joseph P. Remington.

Having occasion to use frequently the ordinary forms of pharmaceutical stills, for recovering alcohol, in making fluid extracts, and for other purposes, and noticing some defective points in their practical operation, the writer finally contrived the apparatus which is figured in the cut, and a continuous use of over three years, having proved its efficiency, it is herewith submitted.

The greatest objections to the pharmaceutical stills, usually sold by the makers, are the use of the water joint, and the short distance remaining between the delivery-pipe and the source of heat when the still is in position. The water-joint is always objectionable; when the still is in use, constant care and attention is required to keep it full of

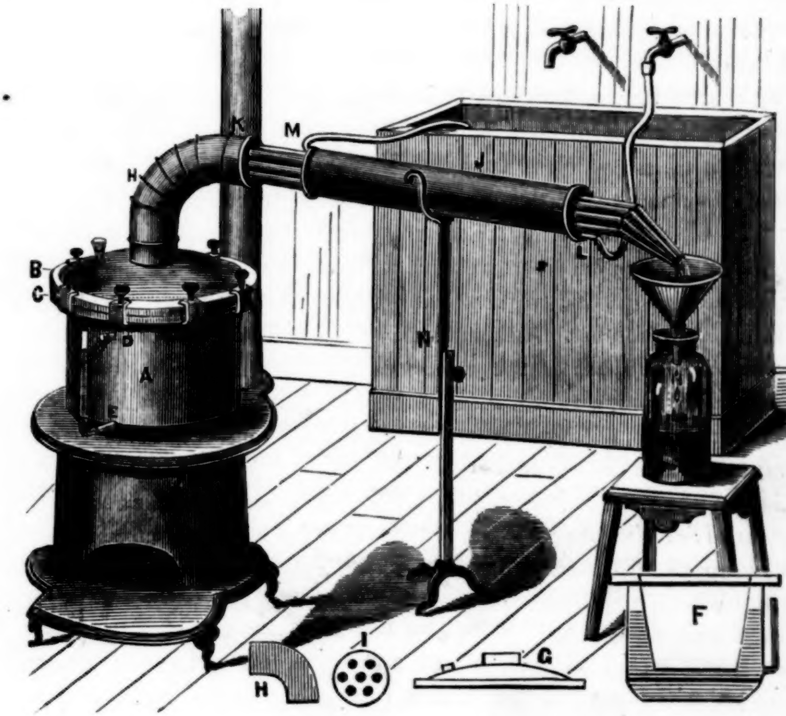
water on account of evaporation, and a sudden tilt or shake requires a readjustment. In some of the stills, where the spirit is condensed upon the dome, the water in the joint gradually evaporating, is replaced by the condensed alcohol, which is wasted by the evaporation, even if more serious consequences do not result, *i. e.*, the sudden bursting into flame by contact with the fire used as a source of heat. The second objection may be counterbalanced, if care is used; but it sometimes happens that the water-supply, used for condensation, suddenly fails, and if alcoholic vapor issues from the delivery-tube, instead of condensed spirit, explosion will likely ensue if it comes in contact with flame.

As expense has usually to be considered in the construction of apparatus for pharmaceutical use, especially if intended for occasional employment, the effort was made to keep the cost down to the lowest point consistent with utility and convenience of application.

It is presumed that most pharmacists use a low stove, such as here figured, or a gas stove, or have access to a kitchen range or furnace. The still proper, A, thirteen inches in diameter, may be constructed of copper, and if a copper can, in which oils of lemon, bergamot, orange, etc., etc., are imported, can be procured, a new bottom may be brazed into it by a coppersmith, and the whole tinned inside; the top is cut off, and two flat brass rings, B and C, one and a half inches wide and half inch thick, are obtained and soldered or riveted to the top and body of the can, as shown in the cut; two half inch short copper tubes D and E are fastened to the body of the still, communicating with the inside for use as a water level; a glass tube bent at right angles at top and bottom is fastened by two short pieces of rubber tube to the copper tubes for this purpose; when the water bath is used (hereafter described) the upper end of glass tube is drawn out of the rubber tube, in order to afford egress for the steam through the upper tube D. A three quarter inch copper tube is let into the top to supply the liquid to be distilled, of course furnished with a cork, when the still is used. A water bath of tinned copper or tinned iron of the shape shown in F, with a flat rim, which accurately fits the brass flat ring, should be provided.

A four inch opening is made in the copper top G, to which is fitted the elbow H; this elbow is best made of tinned copper, but this may be replaced by a tinned iron, "lobster back," gutter-pipe elbow, if first cost must be curtailed. There is an advantage in widening this tube: first, in affording more space for the accommodation of vapor

rapidly forming, and, secondly, for the greater facility with which it may be cleansed, there being no difficulty in getting the hand inside to scour it out.



The condenser, J, however, is the most important part of the apparatus and consists of seven tubes one inch in diameter, thirty-two inches long, surrounded by a cylinder five inches in diameter and twenty-four inches long; the seven tubes are arranged as seen in sectional view I. A cap, K, two inches deep, soldered to the condenser, fits tightly over the elbow H, so that a tight joint is made here—this may be rendered perfectly tight by tying around it a strip of moistened bladder.

A short tube, L, at the bottom of condenser is connected with a rubber tube from hydrant for supplying cold water, and a similar tube at M conveys the heated water into the sink.

The ends of the condenser tubes are drawn together and tapered so that a bottle with an inch and a half mouth may be used for collecting the distillate.

An iron stand, N, adjusted by raising or lowering the U-shaped support, and fastening at any required angle, by means of the screw in the centre, is a convenient way of supporting and keeping in place the whole apparatus—but this may be replaced by a wooden box, cut so as to receive the condenser and blocked up from below to the proper height as required.

The joint between the still and dome is best made by inserting a wetted hempen cord—as used in Dr. Squibb's laboratory, Brooklyn—(the thick twine which is used by the paper manufacturers to bundle reams of wrapping paper answers very well), between the two brass rims B, C, and clamping together, placing the clamps at equal distances, and arranging alternately, so as to secure a uniform pressure.

The advantages which seem to be possessed by this distillatory apparatus are as follows: All parts may be readily cleaned, and, as it is intended for the use of the pharmacist, in the limited space usually afforded for manipulations, care has been taken to make it as compact as is consistent with safety and efficiency. The condenser has the advantage of the worm in affording *extent of surface* to the refrigerating action of the cold water, and is seven times more efficient than the ordinary Liebig's condenser, from the fact that seven tubes are employed instead of one. The advantage of the Liebig is retained—that of the facility with which it may be cleaned by simply passing a rattan, armed with a sponge or muslin rag, which is tied around the end, through each straight tube in turn, and rinsing with warm water or suitable liquid. The disadvantage of the worm for pharmaceutical use, *i. e.*, the great difficulty in cleaning, especially when the still is needed for a variety of purposes, is thus avoided.

The principle of increasing the extent of surface to obtain greater efficiency without adding materially to the size, which has been used so long in the construction of locomotive boilers, was taken advantage of here, with the view of getting similar advantages by the reverse effect. The diameter of the tube being 1 inch, and length exposed to the refrigerating action of water 24, the area would be slightly over 75 inches; this, multiplied by seven, gives the whole extent of surface, 525 inches. Now, the diameter of the outside cylinder surrounding the tubes is 5 inches, this multiplied by 3·1416, and this by 24, would give the surface of the cylinder, nearly 377 inches, and this lacks about 30 per cent. of the extent of surface of the seven inside tubes; so that

there is 30 per cent. more surface exposed by the condensing tubes than is possessed by the containing cylinder.

To the pharmacist, occupied by many various duties, it is an object to be able to save time and trouble, and, with a little practice, it is not difficult with a good fire and the ordinary water supply, in moderate weather (water at 50°F.) to recover a gallon of alcohol from weak tincture in fifteen minutes; the whole apparatus may be set up, the distillation finished, and all finally cleaned and put away easily in 30 minutes. Seven streams issue from the delivery tubes of the condenser instead of one, and the danger arising from alcoholic vapor issuing uncondensed on account of urging the fire, and communication with flame, is almost prevented by the increased power of the condenser.

The condenser should have the inside surface protected from rust by a thick coat of red lead and oil, if made of tinned iron.

Philadelphia, Twelfth mo. 10th, 1877.

GLYCERIN IN PHARMACY.

By C. J. Biddle, Ph.G.

Read at the Pharmaceutical Meeting, December 18, 1877.

Of the discoveries of Scheele, glycerin is one of the most important and useful; although nearly a century has passed since its discovery, it has not been in extensive use but for comparatively few years; improvements in the mode of production have both increased its purity and reduced its cost to the consumer, so that at present its uses in the arts and manufactures are innumerable.

Glycerin entered the list of preparations of the Pharmacopœia in 1850, and was transferred to the materia medica list in 1860; about this period it appeared to be beginning to claim the notice of pharmacists, as in 1865 Mr. Alfred Taylor, of this city, recommended its use in the manufacture of fluid extracts,[1] and since then numerous formulas have appeared in the pharmaceutical journals, the result of which was that our present edition of the Pharmacopœia contains a list of preparations called "Glycerita," and glycerin enters into about thirty-six other officinal preparations. But its use is not limited to the few now officinal, and it can be advantageously used in many more

[1] "Am. Jour. Pharm.," 1865, p. 50.

preparations. Every pharmacist has a just pride in having his preparations to present an elegant appearance, and glycerin will be found useful as a help to accomplish this purpose.

The property glycerin possesses of preventing tincture of kino from gelatinizing has been known for some time, and frequently published.[1] In 1874, at the request of Mr. Wm. F. Bender, Chief Apothecary at the Philadelphia Hospital, I began to use glycerin in syrup of wild cherry, and have used it since that time, always obtaining a much richer-looking syrup than the officinal, which contains all the virtues of the bark. The formula is as follows:

Take of	Wild cherry, in moderately fine powder, .	℥v
	Sugar, granulated, ...	℥xxvi
	Glycerin, concentrated, . . .	℥ii
	Water, a sufficient quantity.	

Mix one ounce of glycerin with four of water, moisten the powder and allow it to stand 36 hours in a close vessel; then pack it firmly in a conical percolator, and gradually pour water mixed with the remaining glycerin until a pint of filtered liquid is obtained; then proceed as usual. A formula somewhat differing from this in the details has been recommended in the "Druggists' Circular," 1874, p. 59.

Glycerin has also been found useful in the preparation of several of the officinal tinctures, for the different classes of which it is used in different proportions. For the resinous tinctures, half an ounce in a pint is quite sufficient; it will produce a percolate of much richer color, and will more thoroughly exhaust the drug. For the astringent and those containing large quantities of coloring matter, one ounce in a pint will prevent precipitation for a much longer time than without it.

By following the general formula given below I have been able to produce very fine tinctures, taking tincture of myrrh for example:

Take of	Myrrh, in fine powder, . . .	℥iii
	Glycerin, concentrated, . . .	℥i
	Stronger alcohol, ...	Oi
	Alcohol, a sufficient quantity.	

Mix the glycerin with five ounces of stronger alcohol, and pour upon the myrrh, previously placed in a wide mouth bottle of sufficient

[1] "Am. Jour. Pharm.," 1877, p. 299.

capacity; cork tightly, and allow it to stand for four days, with occasional agitation; then place it upon a filter, in a funnel, and allow the first added menstruum to filter through; mix the remaining stronger alcohol with one pint of alcohol, and gradually pour upon the myrrh, adding sufficient alcohol to obtain two pints of tincture.

Maceration followed by percolation produces a much finer tincture than direct percolation; in all tinctures for which glycerin is used I endeavor to keep them of full alcoholic strength of the Pharmacopœia.

Glycerin has another very desirable effect in resinous tinctures, as it prevents the accumulation of resin about the stopper and lip of the bottle, and will prevent the stopper from becoming fastened; also "the drop" that falls on the outside of the bottle, from time to time, can be easily removed with a dampened cloth; for these advantages alone it would more than compensate for the amount of alcohol necessarily used to cleanse the bottles containing such tinctures. Glycerin was recommended in compound tincture of cinchona as early as 1872.[1]

In the officinal wines it may be used with advantage also. Wine of ergot, of superior quality, possessing a stronger odor and a richer color than the officinal, is made as follows:

Take of Ergot, in moderately fine powder, . .	℥iv
Glycerin, concentrated, . . .	℥iss
Sherry wine, a sufficient quantity.	

Mix the glycerin with five ounces of sherry wine, moisten the powder with this; place in a close vessel and let stand four days; then transfer to a funnel or percolator; press firmly and gradually; pour sherry wine upon it until two pints of filtered liquid are obtained. This method is to be preferred to making this preparation from the fluid extract, and would suggest that wine of ipecac be made in a similar manner, and that glycerin be used in the remaining wines.

In the preparation of solid extracts a small proportion has been recommended to be added, after evaporation to the proper consistence, to give them a plastic firmness, which is at times very desirable, and also prevents moulding.[2]

As an excipient, in pill masses, its virtues are too well known to need repetition here.

It may be substituted for honey in compound tincture of cardamom,

[1] "Drug. Circular," 1872, p. 96. [2] "Drug. Circular," 1872, p. 139.

and produce quite as richly colored tincture; but in the camphorated tincture of opium the color is not so rich as in the officinal.

Glycerin has been recommended to take the place of carbonate of magnesium in the officinal waters made from oils; but I have failed to produce as good results as with the latter. It will not answer for camphor water, as camphor is not sufficiently soluble in glycerin, even when heated; for the camphor will volatilize before the glycerin is hot enough to dissolve it. But in extracts, mixtures, tinctures and wines of the Pharmacopœia glycerin will be found useful.

Philadelpia Hospital, Philadelphia, Pa.

ELIXIR OF NUX VOMICA AND AROMATIC TINCTURE OF ANGUSTURA.

By E. J. Davidson, Ph. G.

A pleasant aromatic tincture of angustura, which is a fair imitation of the so-called Angustura bitters, is obtained by the following formula:

Take of Powdered	Angustura,	℥ii
"	Cascarilla,	ʒiv
"	Bitter orange peel,	℥iv
"	Cinnamon,	ʒiv
"	Cardamom,	
"	Cloves,	
"	Nutmeg,	āā ʒii
"	Coriander,	ʒii
"	Anise,	ʒv
Glycerin,		f℥ii
Dilute alcohol, sufficient.		

Mix the glycerin with a pint of the diluted alcohol, moisten the mixed powders, pack into a percolator and displace first with the mixture, afterwards with diluted alcohol until two pints of tincture are obtained.

This tincture will assist in disguising the disagreeable bitter taste of nux vomica, and an elixir of the latter, not unpleasant in taste, may be obtained as follows:

Take of	Tincture of nux vomica,	gtt. cxx
	Curacoa cordial,	f℥iii
	Syrup of orange peel,	f℥iiss
	Aromatic tincture of Angustura,	fʒss
	Mix.	

The dose of this elixir will be about a tablespoonful, representing 10 drops of tincture of nux vomica; the proportion of the latter may, of course, be varied if desirable.

SHORT WEIGHT IN SUGAR-COATED PILLS.

BY E. M. WELLS, PH.G.

Pharmacists are cautioned not to purchase or use sugar-coated pills without carefully examining them. A large lot was recently received from a manufacturer in New York. When those marked Compound Cathartic Pills, U. S. P., were opened for dispensing, their small size attracted my attention. The dry material for three comp. cathartic pills, U. S. P., weighs 10¾ grains. The officinal formula was on the wrapper accompanying each box and bottle. The average weight of three of the bought pills, with coating, was found to be 11 grains, and after the coating was removed, 6 grains. The sugar-coating weighed, therefore, 5 grains, and there was a deficiency of 4¾ grains of what the dry material should weigh, equal to 44 per cent. The moisture contained in them was not considered.

So-called improved compound cathartic and Cook's pills were *only* 33 per cent. short in weight.

Fort Worth, Texas, Nov. 15th, 1877.

SOLUTION OF DIALYZED IRON AS AN ANTIDOTE FOR ARSENICAL POISONING.

BY RICH. V. MATTISON, PH.G.

Read at the Alumni Meeting, December 7.

The statement having been currently made by a number of manufacturers of solution of dialyzed iron that this article was of great value as an antidote in cases of arsenical poisoning, and this statement, having subsequently been either doubted or "damned with faint praise" by recent writers, led the author to undertake, for personal satisfaction no less than the general good, to perform the following experiments, with the idea of directly confirming one or the other of the above views. In furtherance of this object, a careful test was made of the glassware and reagents employed for the presence of arsenic, with negative results.

A. Ten centigrams of arsenious acid was dissolved in 25 cubic centimeters of distilled water, and tested for arsenic, abundant evidence of which was readily shown. To this solution 5 cubic centimeters of a 5 per cent. solution of dialyzed iron was added, and the whole diluted with distilled water to the measure of 100 cubic centimeters, and filtered. No apparent change was effected, the filtrate giving abundant evidence of the presence of arsenic. The experiment was again performed, substituting ordinary water, with like result.

B. A like quantity of arsenious acid was dissolved in the same amount of distilled water as before, with the addition of a few drops of hydrochloric acid, and to this solution 5 cubic centimeters of solution of dialyzed iron was added, and the filtrate tested as before, with like result. The experiment was then varied by the substitution of ordinary water and the addition of, first, 1 cubic centimeter of the iron solution, and afterward the addition of 25 cubic centimeters, and dilution of the whole with water to the measure of 100 cubic centimeters; the various testings were without change, the abundance of arsenic being readily shown.

C. A third experiment was now instituted. Ten centigrams of arsenious acid being taken as before, and dissolved in the same quantity of water, this was added to 1,000 cubic centimeters of a solution made to represent the gastric secretion of the human stomach, and composed as follows:

Water,	994·40	Chloride calcium,	0·06
Pepsin,	3·19	Hydrochloric acid,	0·20
Chloride sodium,	1·46	Phosphate magnesium,	0·12
Chloride potassium,	0·55		

The quantity of this fluid taken (1,000 cubic centimeters) was believed to represent about the normal quantity of gastric juice present in the human stomach during digestion, or that would be induced upon the ingestion of a quantity of arsenic. Immediately after the addition of the iron solution, the whole was transferred to a filter, and the colorless filtrate tested by Fleitmann's and Marsh's test. No evidence of the presence of arsenic could be discovered, and the experiment was repeated with like result.

The experiment was then varied by dissolving 50 centigrams of arsenious acid in the above quantity of artificial gastric fluid, and allowing the whole to remain at a temperature of 38°C. (100°F.) for two

hours, with occasional agitation. The mixture was then transferred to a filter, and 100 cubic centimeters of the filtrate evaporated to 5 cubic centimeters, and this added to a Marsh's apparatus of 100 cubic centimeters capacity, without the slightest trace of arsenic being shown on the application of the test.

This experiment was repeated with like result, with both Fleitmann's and Marsh's tests, without a trace of arsenic being obtained.

After the repeated unsuccessful attempts, to detect the presence of arsenic in this way, one drop of liquor arsenii chloridi was added to each flask (still containing the filtrates as above described), and the result was immediate, the presence of arsenic in considerable quantity being instantly shown by the characteristic reactions.

Through these experiments, then, the facts seem clearly set forth, (1) that dialyzed iron, to be of vulue as an arsenical antidote, must be first precipitated by the action of some neutral salt, (2) that this precipitation, and the consequent production of ferric hydrate, is accomplished when this preparation is taken into the stomach, and that, (3) therefore, the solution of dialyzed iron is a valuable antidote for arsenical poisoning, and should be administered promptly in cases of emergency, followed, of course, by an emetic until more efficient remedies can be used.

It, however, may readily be conceived that an antidote may be necessary in cases where the enfeebled stomach of the invalid may not be able to secrete sufficient gastric juice, even under the direct stimulus of the poison, or that the arsenic may be ingested into a stomach that is free from the presence of any gastric secretion. Now, while under these circumstances the mucous secretion might prevent absorption for a certain length of time, yet in these cases, and, indeed, we believe in *all* cases, the administration of solution of dialyzed iron as an antidote for arsenical poisoning should be immediately followed by a teaspoonful or more of sodium chloride, thus insuring the formation of ferric hydrate and the consequent neutralization of the poison.

With this addition, solution of dialyzed iron is the most convenient antidote, certainly, to be obtained, and should be kept in every well-regulated pharmacy for cases of emergency; and manufacturers should make the addition to their labels directing the additional use of this salt (sodium chloride), as through its use, while no harm can be done, many valuable lives might be saved, which, through the use of dialyzed iron alone, would possibly be sacrificed.

Since the above was in the hands of the publishers, we note a case of arsenical poisoning successfully treated by the administration of solution of dialyzed iron alone, as reported in the Philadelphia "Medical Times," Dec. 8th, pp. 104, 105. The patient, a young lady of normal health, inadvertently swallowed a considerable quantity of arsenic, which had became by accident mixed with some confectionery, and when the attending physician saw her she presented the symptoms of poisoning in a well marked degree. Solution of dialyzed iron was administered with prompt relief, yet, strange to say, this was not followed by an emetic, but the use of the dialyzed iron, continued in doses of 2 fluidrachms, largely diluted with water. The doctor notes the recovery of the patient.

The occurrence of this case and the treatment pursued, while successful, does not convince us that it would in a similar case be at all proper or justifiable to rely entirely on the solution of dialyzed iron as an efficient antidote, if not followed by the free use of sodium chloride; as we contend that where any doubt exists the patient should have the benefit of it, and, through the exhibition of other remedies, so multiply the chances of escape that death should ensue only from neglect of these.

Philadelphia, 12th mo. 15th, 1877.

ON OIL OF HEMPSEED.

BY H. BETZ.

(*Read at the Alumni Meeting, December* 7.)

This oil is obtained from the fruit of Cannabis sativa by expression. By means of a hydraulic press, and 2,000 pounds to the square inch, a good commercial quality of hempsed yields from 15 to 18 per cent., though according to some statements 24 to 30 per cent. can be obtained.

Oil of hempseed has a peculiar hemp odor, a sweetish, mild, oleaginous taste, deep-green color, and, if held before a flame, shows the complementary hue scarlet, if the column has fifteen sixteenths of an inch or more in diameter; at thirteen-sixteenths, it is red with a yellowish shade; at twelve-sixteenths, yellow; at ten-sixteenths, yellow with a greenish tinge; at eight-sixteenths, green with a yellowish shade, and at six-sixteenths and below it has lost this power of dichroism.

The specific gravity is 0·9319, it boils at 550°F., and from 180° gives off very disagreeable and irritating fumes. At 5°F. it acquires a

thick, honey-like consistence. Proximately, it consists of a large proportion of olein and a rather small one of stearin; its color is not extracted by cold or boiling water nor alcohol. It is insoluble in alcohol, but freely soluble in benzin, oil of turpentine, ether and olive oil. Boiled with an equal part of a solution of 18 per cent. of potash, a translucent homogenous mass or soap, of a deep-green color, is produced. The soda soap is of a lighter green color, and of a more flaky consistence.

The pure oil, I think, may be distinguished from some of the fatty oils as follows: If mixed with cocoanut oil the mixture [in which proportion?—EDITOR] will congeal at 12° above zero; if mixed with expressed oil of laurel, alcohol will extract the green color of the latter, and should castor oil be the admixture, alcohol will detect it.

NOTES ON CASUAL DRUGS.[1]

BY E. M. HOLMES, F.L.S.

Occasionally drugs which have no recognized value in England are sent over on speculation from foreign countries. These find their way into the dock warehouses at the principal ports, such as London and Liverpool, and if no commercial use is discovered for them, they remain in the warehouses until the expense of housing them necessitates their sale. Such sales are known as "rummage sales" and take place periodically.

Inasmuch as the drugs thus sent to English ports are in most cases of value, or at least are thought to be so in the countries from which they are exported, a short notice of them may, perhaps, present some points of interest.

At a sale of the kind alluded to, which took place last month, the following articles were noticed:

Tamarisk Galls.—These small galls came from Mogadore. They vary in size from that of a pea to a horsebean, or more rarely reach the size of a small nut. The taste is powerfully astringent. Internally they are found to be full of small cavities, in which, however, the insect that forms them is very rarely found in a state to be examined. So far as I am aware, the name of the insect has not yet been

[1] Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 7, 1877.

determined. The galls contain about 40 per cent. of a very pure tannin.

In Morocco these galls are known under the name of Tacout, and are produced upon the twigs of *Tamarix articulata*, Vahl. In India, similar galls are produced upon *Tamarix Gallica*, L., and *Tamarix orientalis*, Vahl.; those of the former plant are usually rather larger, and are called Bara-mai in Hindostanee; the smaller ones, from *Tamarix orientalis*, being called Chota-mai. The Tamarisk galls of India also occasionally find their way into English commerce, and if better known would probably be largely used for tanning purposes.

A strong infusion of these galls has been recommended in India as an application to foul ulcers, and by the natives they are used in diarrhœa and dysentery.

Calophyllum inophyllum, *L.*—The fruits of this plant were imported from the Mauritius under the name of oil seeds. The fruits as imported consist of the hard woody endocarp. They are about the size of an English oak gall, nearly globular, with a small projecting point at one end, and contain a yellowish-white oily kernel. According to the official report of the products in the India Museum, the seeds yield 60 per cent. of a fragrant green oil, fluid at ordinary temperatures, but beginning to solidify when cooled below 50° Fahr.

In India it is used as a lamp oil and also as an outward application for rheumatism. Although apparently unknown in the commerce of this country in 1847–8, nearly 4,000 gallons of the oil were exported from Madras to Ceylon and the Straits settlements. The tree yielding these seeds bears handsome white fragrant flowers, and it may not be out of place here to remark that there is a wide field for experiment among the native plants of India for those interested in perfumery. The following note, extracted from Seemann's "Flora Vitiensis," will show how highly the oil obtained from these nuts is esteemed in Fiji, as well as the method of extraction:

"The most valuable oil produced in Fiji is that extracted from the seeds of this tree, the dilo of the natives, the tamarind of Eastern Polynesia, and the cashumpa of India. It is the bitter oil or woondel of Indian commerce. The natives use it for polishing arms and greasing their bodies, when cocoa-nut oil is not at hand. But the great reputation this oil enjoys throughout Polynesia and the East Indies rests upon its medicinal properties as a liniment in rheumatism, pains

in the joints and bruises. Its efficacy in this respect can hardly be exaggerated, and recommends it to the attention of European practitioners. The oil is kept by the Fijians in gourd flasks, and there being only a limited quantity made I was charged about sixpence per pint for it, paid in calico and cutlery. The tree is one of the most common littoral plants in the group; its round fruits, mixed with the square ones of *Barringtonia speciosa*, the pine cone-like ones of the sago palm, and the flat seeds of the walai (*Entada scandens*, Benth.), densely cover the sandy beaches. Dilo oil never congeals in the lowest temperature of the Fijis, as cocoa-nut oil does during the cool season. It is of a greenish tinge, and very little of it will impart its hue to a whole cask of cocoa nut oil. Its commercial value is only partially known in the Fijis, and was found out accidentally. Amongst the contributions in cocoa-nut oil which the natives furnish toward the support of the Wesleyan missions, some dilo oil had been poured, which on arriving at Sydney was rejected by the broker who purchased the other oil, on account of its greenish tinge and strange appearance. On being shown to others a chemist, recognizing it as the bitter oil of India, purchased it at the rate of £60 per tun, and he must have made a good profit on it, as the article fetches £90 a tun.

"In order to extract the oil the round fruit is allowed to drop in its outer fleshy covering and rot on the ground. The remaining portion, consisting of a shell somewhat of the consistency of that of a hen's egg, and enclosing the kernel, is baked on hot stones in the same way that Polynesian meat and vegetables are. The shell is then broken, and the kernels pounded between stones. If the quantity be small, the macerated mass is placed in the fibres of the vau (*Hibiscus tiliaceus* and *tricuspis*), and forced by the hand to yield up its oily contents; if large, a rude level press is constructed by placing a boom horizontally between two cocoa-nut trees and appending to this perpendicularly the fibres of the vau. After the macerated kernels have been placed in the midst, a pole is made fast to the lower end of the fibres, and two men, taking hold of its end, twist the contrivance round and round till the oil, collecting into a wooden bowl placed underneath, has been extracted. Of course, the pressure thus brought to bear upon the pounded kernels is not sufficiently great to express the whole of the oil, and there is still much waste."

Boomah Nuts.—These are the fruits of *Pycnocoma macrophylla*,

Benth., a small tree belonging to the *Euphorbiaceæ*. These fruits were imported from Natal under the name of galls, probably on account of their bearing a strong resemblance to Aleppo galls in shape and size. Externally they have a black color, and when broken open exhibit a hard three-celled endocarp, each cell containing a single seed. The seeds in shape and color are not unlike a castor oil seed, but are less than half the size and have no appreciable taste.

The Boomah nuts are said to be used for tanning in Natal. The tannin is contained in the outer coat, or sarcocarp, and must be very small in amount, considering the size of the fruit, since so large a portion is occupied by the woody endocarp. These nuts are not likely, therefore, to be able to compete in this country with other tanning materials.

Barosma ericifolia, *Andr.*—This drug is a species of buchu leaves. The leaves are very small, resembling in size and shape the leaves of the heath, whence the specific name. The odor of the leaves is powerful, but differs somewhat from that of the official species, having a slight resemblance to the odor of caraways. These leaves are used by the Hottentots in the same way as the official kind, and also as a perfume, and in the form of tincture as an application to wounds.

Empleurum serrulatum, *Ait.*—The leaves of this plant are mentioned in "Pharmacographia" as being offered for buchu in this country. The characters pointed out in that work render it an easy matter to distinguish it from the leaves of *Barosma serratifolia*, Willd., the species which it most closely resembles. One feature, however, not noted in that work, is very easily observed. When a leaf of *Barosma serratifolia* is held up to the light the lateral veins are seen to be much straighter, longer, and more strongly developed than in the leaves of *Empleurum serrulatum*.

Loomoonderfall.—The large fruits which bear this name were imported from Zanzibar, and are, I am told, possessed of properties similar to those of cocculus indicus. I have not as yet been able to ascertain the name of the tree which produces them.

Cassia Tora, *L.*—These seeds were imported under the name of Fantupa seed. They are about the size of an apple pip, greenish-brown, polished, pointed at one end and irregularly angular. The leaves of this plant ars used in India for ringworm, and the seed of another species (*Cassia absus*, L.) has been used in purulent ophthalmia, but the object with which the seeds of *C. Tora* were sent to this country, I am not able to conjecture.—*Pharm. Journ. and Trans.*, Nov. 10.

JAVA RHUBARB.

By Professor Husemann.

Upon the Gunung Unarung and other mountains in Java there grows, at an elevation of two to four thousand feet, a species of *Rheum*, the root of which forms an article of commerce, and is used by the Javanese as a purgative under the name of "*akar kelomba.*" Three varieties of this drug are met with in commerce: (1) *akar kelomba bras*, the top part of the root, with fragments of stock still adhering; (2) *akar kelomba ketan*, the middle portion of the root; and (3) *akar kelomba keteba*, the bottom portion. Of the three the second named kind is the most valuable, whilst the top portion of the root, combined with fragments of stalk, is of the least value.

A detailed description of the best kind of Java rhubarb has been given by J. H. Schmidt in the "Tydschrift voor Nederlandische Inde" (xvii, p. 98), according to which the root is fleshy, and long conical, or somewhat napiform. In some places it is still covered with a dark-brown rind, whilst the remainder is peeled, and appears marbled with white and red. In a transverse section the rays run from the centre to the circumference, traversing the concentrical red-colored rings, and appearing to break off at the cambium, which forms a dense dark-brown, resinous looking layer, from 1·1 to 1·5 millimeter thick. The most central concentric rings are bright red and alternate with yellow ones. At the centre, in some fissures resulting from the drying, are seen some white felt-like threads, having a silky lustre; the structure of these can be recognized under the microscope. In a longitudinal section are seen in the centre the almost rectangular parenchyma cells, partially filled with chrysophanic acid. With the aid of a glass, cells containing crystals of oxalate of lime can be detected.

The Java rhubarb resembles the Chinese in smell and taste almost completely; but according to some experiments made by Dr. v. Vogelpoel its activity is one-fourth less.

In 1874, Schmidt brought under the consideration of the Dutch East Indian government the advisability of experimenting whether it was possible to increase the activity of this species of *Rheum* by cultivation, and thus to obtain a drug equal to the Chinese rhubarb, but very much lower in price. The plant appears to be very abundant in Java, and the best kind of root, the *akar kelomba ketan*, is sold there at about 1*s.* 8*d.* per kilogram. As the therapeutic value of the Chinese

rhubarb root increases, within certain limits, with the age of the plant, even if the experiment be carried out, it will be some years before the result is known, but it would be possible in this way to secure roots of one age instead of a mixture of roots of all ages, as at present.

The comparative analyses carried out by Schmidt between the official rhubarb and the best Java rhubarb show, however, some differences, and raise a doubt as to how far the Java root possesses the tonic properties of Chinese rhubarb.

In the first place, the amount of ash differs. Calcined in a platinum dish the official rhubarb gave 12·15 to 12·24 per cent. of ash; the Java root yielded 6·27 to 6·91 per cent. A more detailed representation of the proportion of the inorganic constituents is given in the following table, in which unfortunately oxalic acid does not appear, the analyst having been prevented from completing the estimation:

	Radix Rhei officinalis.	Radix Rhei Indicæ Javanicæ.
CaO,	46·80512	41·68051
MgO,	4·24359	5·26484
KO and NaO,	7·35024	16·89486
CO_2,	35·34188	19·25190
SO_3,	1·11452	2·82191
PO_5,	5·11709	6·78689
Cl,	0·60683	2·09575
SiO_3,	0·59828	1·97869
Carbon and sand,	0·76923	2·98934
	101·94678	99·76469

Schmidt has also attempted to estimate quantitatively some of the organic bodies which play a part in the therapeutic action of rhubarb; the result is shown in the following table:

	Radix Rhei officinalis. per cent.	Radix Rhei Indicæ Javanicæ. per cent.
Rheotannic acid,	2·106	0·430
Phaeoretin,	0·151	0·090
Chrysophan,	0·056	0·107
Chrysophanic acid,	4·700	1·646
Emodin,	0·580	2·000

From this it would appear that the rheotannic acid and the chrysophanic acid are present in the Java root in much smaller proportion than in the Chinese, whilst chrysophan and emodin are present in larger proportion in the Java root. Although the figures in this table cannot be taken as absolutely correct, in consequence of the great

difficulty attending the separation of the organic constituents of rhubarb, it may be assumed that to a degree it is an expression of the differences between the two kinds of rhubarb. If chrysophanic acid be the active principle, then the inferior activity of the Java root depends probably upon the smaller quantity of chrysophanic acid present in it, and the activity might have been still further reduced if it were not for the simultaneous diminution in the proportion of tannic acid, which by its antipurgative action might act antagonistically to the chrysophanic acid. Professor Husemann considers it highly probable that the relative proportions of these constituents might be altered by cultivation so as to approximate the two rhubarbs more closely.

At present no information exists in botanical literature as to the plant from which the Java rhubarb is derived. Rosenthal's "Synopsis Plantarum Diaphoricarum" does not refer to any species of rhubarb growing in Java. Still, the Dutch East Indian botanists ought not to find any difficulty in deciding how far the plant should be treated as a new species or as one of the many continental East Indian species. But certainly the investigation throws no light upon the origin of the true rhubarb root.—*Phar. Jour. and Trans.*, Oct. 27, from the *Phar. Handelsblatt*, No. 94.

VARIETIES.

Tests and Effects of Sophoria.—Dr. H. C. Wood describes this new alkaloid, obtained by him from the seeds of Sophora speciosa, Benth., as follows:

I obtained it of a grayish-white color, but did not succeed in crystallizing either it or its acetate. Its reactions, as far as I have examined them, are as follows (the tests were made by placing a speck of the alkaloid upon a porcelain plate and applying the reagent).

With concentrated sulphuric acid, no color.

With chromic acid and concentrated sulphuric acid, a dirty, deep purple, passing rapidly into bright green, then into blueish and finally into yellowish-brown.

With tincture of the chloride of iron, a deep, almost blood-red, after a time acquiring an orange tint.

With nitric acid, no color.

With chromic and nitric acid, a very faint, evanescent reddish color.

With nitromuriatic acid, a dirty reddish-brown.

From the solution of its acetate, compound tincture of iodine throws down a yellowish precipitate.

I have made physiological experiments with an alcoholic extract of the bean upon the lower animals sufficient to outline its general action.

In *frogs* it produces a rapid loss of reflex activity and power of voluntary movement. The loss of power is not due to any action upon the motor nerve-trunks, as after death these were found to preserve their normal susceptibility. Further, tying the sciatic artery upon one or both sides of the frog did not influence the action of the drug upon either voluntary or reflex movements. This would indicate that the poison is a spinal sedative and has little or no effect upon either motor or sensitive nerves. In all cases the heart continued beating long after the cessation of respiration.

Upon *mammals* the effect varies somewhat in accordance with the dose. An amount of the extract estimated at two grains (?) produced, in a full grown tom-cat, in one minute marked weakness in hind legs, in two minutes inability to stand, with evident effect upon the respiration, in three minutes convulsive movements with loss of consciousness, continuing with ever-increasing embarrassment of the breathing for three minutes, when all attempts at respiration ceased. The heart kept on beating for one and a half minutes longer. The pupils were unaffected at first, afterwards dilated.

In small quantity the extract produces in the cat vomiting, great muscular weakness, profound quietude, and deep sleep, lasting some hours, and ending in recovery. In dogs the symptoms were similar to those noted in cats. Death always took place through the respiration. In a single cardiac experiment the drug had no decided effect upon the blood-pressure until towards death, but appeared to accelerate the cardiac beat.—*Philada. Med. Times*, Aug. 4, 1877.

Salicylic Acid and Salicylate of Soda in the Treatment of Neuralgia. (The "Medical Record," Sept. 1, 1877).—Dr. Descroizilles has employed salicylic acid and salicylate of soda in seven cases of neuralgia with satisfactory results. The number of cases is too small to permit a judgment to be formed from them of the therapeutic value of the two drugs, but they demonstrate the advantages which the salt possesses over the acid in the treatment of this disease. All the cases were cured, but in the three cases in which the acid was administered it produced a certain amount of deafness. In two of these cases it also exerted an energetic irritant action on the mucous membranes of the digestive and respiratory tracts, and in the other it caused vertigo, general weakness and well-marked hebetude. The salt did not exert any injurious action either on the mucous membranes or on the nervous system. It was not necessary to give it in as large doses as the acid, and the cure was rapidly effected. From 1 to 5 grams of the salt were given daily, while in one of the cases treated by the acid as much as 7 grams were given in one day. In all the cases the treatment was begun with small doses (1 to 2 grams), which were increased by a gram a day until the desired effect was obtained.—*Phila. Med. Times*, Sept. 29.

Apomorphia as an Expectorant ("The Clinic," Sept. 1, 1877).—Dr. Moritz Wertner records ("Wiener Med. Presse") his experience with this agent in a large

number of cases. He employed it with both adults and children in quite minute (1-16 grain) doses, frequently repeated. He considers it a perfectly safe remedy, as he has never observed any ill effects follow its administration.—*Ibid.*

Starch-gloss was found to be made by fusing together 60 parts of paraffin with 40 parts of stearin.—*Industriebl.*

The souring of milk during thunderstorms is attributed by Dr. M. W. Iles to the formation of ozone and the production of lactic, and most probably some acetic acid. Fresh milk introduced into an eudiometer tube, together with pure oxygen gas, curdled very perceptibly after sparks of electricity from an ordinary battery and a small Ruhmkorff coil had been passed through the gas for about ten minutes.—*Chem. News*, Nov. 30.

The coloring matter of Tagetes patula, according to Latour and Magnier de la Source, appears to have the composition $C_{27}H_{22}O_{13}$, and while its reactions are identical with those of quercitrin, it differs from the latter in its crystalline form and solubility. The authors proposes to call it *quercetagetin.*—*Comp. Rendus*, Nov. 12.

Water as Oxidizing and Reducing Agent. By E. Erlenmeyer.—When lactic acid is heated with dilute sulphuric acid, it is resolved into aldehyd and formic acid. In this reaction the hydrogen exerts a reducing action on the carboxyl and the hydroxyl, an oxidizing action on the rest. As glycollic acid is decomposed in an analogous way, it appears possible that the lowest homologue, carbonic acid, might in a similar way yield formic acid and hydrogen dioxide, which would then be resolved into water and oxygen. This reaction explains very simply the exhalation of oxygen by plants.—*Jour. Chem. Soc.*, 1877, 581, from *Deut. Chem. Ges. Ber.*

The Volatile Acids of Croton Oil. By J. Berendes (*Deut. Chem. Ges. Ber.*, x, 835–837).—Geuther and Fröhlich presume that the tiglic acid which they found in croton oil was identical with Frankland and Duppa's methylcrotonic acid. The author has confirmed this statement. Both acids form plates having a peculiar smell like that of gum benzoin, melting at 64°, and boiling at 196—197°. The calcium salts form small, foliated, warty masses, and contain 3 mols. of water; the barium salts are similar, but contain 4 mols. of water. The silver salts are white crystalline precipitates, and the two ethyl ethers boil at 154—156°. By fusing with potash the acids are resolved into acetic acid and propionic acid. Bromine converts them into a dibromovalerianic (dibromomethylethylacetic) acid, melting at 82—83°; and hydriodic acid forms moniodovalerianic acid, melting at 86·5°. They are not changed by the action of sodium-amalgam and water, but on heating them with hydriodic acid and phosphorus to 160°, methylethylacetic acid is formed, boiling at 173—175°, and yielding an amorphous barium salt.

The higher-boiling portion of the volitile acids contains small quantities of higher homologues, one of which, $C_6H_{10}O_2$, boiling at 204°, was isolated. Of volatile fatty acids the following were found: formic, acetic, isobutyric and common valerianic (isopropylacetic). The calcium salt of the latter forms with calcium tiglate a molecular compound crystallizing, in long needles.—*Jour. Chem. Soc.*, Nov.

Commercial Oxalic Acid Contaminated with Sulphuric Acid. By O. Binder. —In analyzing oxalate of ammonium, the author found that it contained a large quantity of sulphuric acid. The oxalic acid used for the preparation of the former also contained sulphuric acid to the extent of 0·4 per cent. The acid was present in the free state, enclosed in the crystals, but also as acid sulphate. Wicke found the same contamination in oxalic acid in 1857.—*Jour. Chem. Soc*,, Nov. 1877, from *Zeitschr. Anal. Chem..* xvi, 334.

Estimation of Nitrous and Nitric Acids. By G. Lunge.—1. *Estimation of Nitric Acid.*—The author finds that the estimation of nitric acid by oxidation of ferrous sulphate (Pelouze), determining the excess of the latter by permanganate, gives accurate results; he recommends adding 20 per cent. of its weight of sulphuric acid to the solution before heating with the nitrate, to facilitate the oxidation. Siewert's method, reduction in alkaline solution by zinc and iron, gives low and variable results. Hager's modification and Schulze's process are also untrustworthy.

2. *Estimation of Nitrous Acid.*—The methods were tested on a solution of pure silver nitrite in sulphuric acid. Feldhaus' permanganate method gives good results, but the standard solution must not be too strong, and the nitrite solution should be added to it, not *vice versa*, or there will be loss from the decomposition of the nitrous acid and escape of nitrogen dioxide. It is advisable to keep the solution at 40—50°, as at lower temperatures the reaction does not take place instantaneously, so that the point of decolorization cannot be so accurately observed. Gerstenhöfer's modification of the bichromate method does not give equally good results, as it is difficult to observe the exact point when all the chromate is reduced. The other processes examined, namely, Siewert's, Hart's and Crowder's, did not give accurate or constant results.

3. *Estimation of Nitrous and Nitric Acids.*—The nitrous acid in the mixture is first determined by oxidizing it to nitric acid by standard permanganate, and then the total quantity of nitric acid present in the solution is estimated by means of ferrous sulphate. The amount of nitric acid originally present is found by subtracting from the result that formed by the oxidation of the nitrous acid.

4. *Analysis of a "Nitrose."*—This "nitrose" (sulphuric acid used to absorb nitrous fumes) from a soda factory, had a density of 1·691 at 15°, and was saturated. It contained 4·13 grams N_2O_3 in 100 cc., but no nitric acid. This result differs from those obtained by Winckler, who found nitric acid present. This, however, was probably due to the analytical method employed; for Winckler added the permanganate solution to the nitrose, and experiments made by the author with a solution

of silver nitrite in sulphuric acid showed that in this case not only was nitric acid formed, but that nitrogen escapes as dioxide. It should be stated, however, that Kolbe found nitric acid in nitrose, although the nitrous acid determinations were made by adding the solution to the permanganate.—*Jour. Chem. Soc.* [Lond.], Nov., 1877, from *Deut. Chem. Ges. Ber.*, x, 1873—1076.

Determination of Nitrous Acid in Potable Waters. By R. Hercher.—Schönbein's test for nitrous acid is condemned as of little value.

Separation of iodine from an iodide—zinc iodide is the best—is recommended as a good test. The test depending upon oxidation of ferrous sulphate serves to detect 0·00025 mgm. nitrous acid in 100 cc. of water.

The amido benzoic acid test is much less delicate than the preceding.

Of the quantitative tests for nitrous acid, the permanganate is the best, but even this is not very satisfactory.—*Jour. Chem. Soc.* [Lond.], Nov., 1877, from *Arch. Pharm.* [3], x, 436—439.

Action of Tartaric Acid on Calcium Carbonate. By B. J. Grosjean.—Both precipitated carbonate and whiting were digested in 20 parts of boiling water containing 4 pts. of tartaric acid. Neither carbonate was dissolved, even when the acid was doubled and concentrated to a syrup. But addition of water caused solution even in the cold. Thus a weak solution of tartaric acid acts better than a strong solution of *the same weight of acid* on calcium carbonate. If, however, the carbonate is treated with 20 parts of water *saturated* with tartaric acid, solution is brought about by heating, even without dilution.—*Jour. Chem. Soc.*, Nov., from *Chem, News*, xxxv, 190.

Adulteration of Santonin with Boracic Acid.—The *Lyon Medical* says that the high price of santonin has led to its adulteration with boracic acid, and that nearly 25 per cent. of the acid has been found in some parcels. The crystals of the two bear some resemblance, but it is easy to detect the fraud by exposing the article to the light for several days, when the crystals of santonin will become yellow from the formation of photo-santonic acid, whilst the other crystals will remain unchanged. Further, pure santonin burns without residuum. If the mixture be calcined and the product treated with boiling water, boracic acid crystals will be deposited on cooling. Chloroform will dissolve santonin, but not boracic acid.—*Pacif. Med. and Surg. Jour.*, November.

On the Antagonism between Nicotin and Strychnia.—Dr. Francis L. Haynes, Assistant Surgeon to the Episcopal Hospital, Philadelphia, from a number of experiments detailed in a monograph published in the Proceedings of the American Philosophical Society, January to May, 1877, draws the following inferences:

1. Strychnia and nicotin are in no degree antagonistic poisons.

2. Strychnia increases the convulsive action, and does not diminish the motor paralysis of nicotin.

3. Nicotin (even in paralyzing doses) increases the convulsive action of strychnia.

4. Both poisons cause death by paralyzing the respiratory apparatus. They may affect respiration in different ways, but the result is the same.

5 Animals may be killed by injecting together doses of the two drugs, which singly are not fatal.—*American Med. Journal—Pac. Med. and Surg. Jour.*, Nov.

John Broughton, the chemist of the cinchona plantations in British India, has not been heard of since undertaking a journey from Ootacamund to Madras during last year. As he was known to have a large sum of money in his possession, it is supposed that he has been waylaid and murdered.—*Dublin Med. Press and Circ.*, Nov. 14.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, Dec. 18, 1877.

The third pharmaceutical meeting of the series was held at the College Hall, President Dillwyn Parrish calling the meeting to order; the minutes of the last meeting were read and approved. The history of the origin of these meetings was briefly stated by the president: Prof. Wm. R. Fisher, in 1842, having suggested to several of the most active members of the College the great advantage that would almost certainly accrue to those attending them and to the readers of the "Journal," induced seven of them to sign a paper asking for the use of the hall and library to carry out the plan.

The following donations to the library were made by Prof. Maisch in behalf of the publishers: "Transactions of the International Medical Congress of 1876," "The Chemists' and Druggists' Diary for the year 1878" and "Farquarhson's Guide to Therapeutics." On motion of Wm. B. Webb, the Registrar of this meeting was directed to return the thanks of the meeting to the respective donors.

Chas. J. Biddle, Ph.G., read a paper upon the use of glycerin in pharmacy, which elicited some discussion and was referred to the publication committee (see page 19).

Mr. Shinn asked whether any of the members had experimented upon the removal of the *fixed oil* from *ergot* when preparing the fluid extract? In reply, Prof. Maisch stated that the fixed oil was generally acknowledged to be inert, and his rule was to remove it by filtration; the British Pharmacopœia directed it to be removed by ether, previous to preparing the extract, and very likely petroleum benzin would be found serviceable for this purpose.

Salicylate of lithia has been prescribed lately to considerable extent, and it was stated that the salt was now made by several manufacturing chemists, and that it was used as a remedy for rheumatism.

A memorandum from Hermann Betz, a member of the present class, was read in which it was stated that he had experimented upon himself with the *seed of Sophora speciosa* shown at the last meeting, by taking one-fourth of a seed in powder. He found the hard shell nearly tasteless, the kernel of a peculiar bitter taste; after an hour a slight dizziness and numbness in the spine was experienced, which, in another hour, increased to such an extent as to impair the walking, and was followed by headache and several evacuations. The headache had increased after a sleep of 2½ hours; the temperature of the body was now 97°F., and the pulse had decreased from 83 to 60 beats in the minute. The effects decreased very slowly and were still perceptible after 24 hours, together with the peculiar numbness in the spinal column.

Several members announced that they were unable to report at this meeting, as they had hoped, on certain subjects which had claimed their attention lately, but would endeavor to do so at the next meeting. The subjects of *new indigenous drugs*, *alteration of chloral hydrate*, and the pharmaceutic uses of *oil of benne* were mentioned; and on motion of Chas. L. Mitchell all were requested to inform the Registrar one week before each meeting of such subjects which they intend to report on or to bring up for discussion. In connection with oil of benne, it was stated that the fixed oils of mustard and cottonseeds appeared likewise to be uesful for some purposes, and might be experimented with.

The meeting then adjourned. T. S. Wiegand, *Registrar*.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Alumni Association, Philadelphia College of Pharmacy.—The third social meeting was held Thursday, December 6, 1877, President Mattison in the chair and some sixty odd members present.

Mr. Kennedy noticed a case of the poisoning of a child, who took a half ounce of chlorate of potassium in crystals, and, despite the remedies employed, expired in great suffering. Mr. McIntyre referred to a similar case which happened sometime since in Wisconsin.

Mr Kennedy gave a description of a drug-store in the coal regions, which he assisted in appraising. The manner of conducting the business seemed rather curious.

Mr. H. Betz read a paper on the expressed oil of hemp seed, handed to him for examination at the last meeting (see page 26).

Dr. Miller showed specimens of oils of mustard-seed and flax-seed, the latter expressed cold. The former oil is said to emulsify with aqua ammoniæ, thus being fitted for use in Linimentum ammoniæ.

Mr. Mattison read an interesting paper on the use of dialyzed iron as an antidote for arsenic (see page 23). The question of its efficacy was established, if its administration was followed by some salt which would induce the formation of the magma in the stomach. Chloride of sodium, as the most convenient, was chosen for this purpose.

Mr. Neppach, a member of the class, from Portland, Oregon, promised a paper for a future meeting on the Chinese drug-stores of the Pacific coast, and showed a specimen of Chittem or barberry bark, which was presented to the College.

Dr. Miller explained the terminations of the five Latin declensions, and showed their connection with pharmaceutical names. A table of them was placed upon the blackboard for the use of the students. The relative merits of the different systems of pronunciation was discussed, the sentiment generally being in favor of the English method, though Dr. Miller stated that the Roman was fast being adopted.

The meeting then adjourned to Thursday, January 3, 1878.

WALLACE PROCTER, *Secretary.*

Pharmaceutical Society of Great Britain.—At the pharmaceutical meeting held December 5, Mr. J. Williams read a paper on *Nitrite of Ethyl,* which he recommended to prepare by slowly passing nitrous acid gas, evolved by acting with nitric acid upon starch, into strong alcohol kept as cool as possible. When the gas ceases to be absorbed, the liquid is distilled at a very gentle temperature, and the vapors passed first through a small empty flask and then through one containing a little water, in which all the alcohol, free acid and most of the aldehyd are retained; the vapors are now passed over a strong solution of potassa contained in a third flask, whereby the remaining aldehyd is absorbed, and the gaseous nitrous ether may then be condensed in a tube placed in a freezing mixture, which must afterwards be hermetically sealed, or, preferably, conducted into a known weight of absolute alcohol, the increase in weight indicating pure nitrous ether. This solution, if containing 50 per cent. of the ether, has the spec. grav. ·850; if 25 per cent., ·824, and if 10 per cent., ·810 spec grav. If treated with twice the bulk of saturated solution of calcium chloride, they separate respectively 48, 23 and 5 per cent. of oily liquid by measure; a 5 per cent. solution separates only a very thin oily film. The mixing of the two liquids must be effected slowly and with care, to avoid loss of ether in consequence of the rise in temperature; a stream of cold water should be kept constantly running over the tube, and even then some loss of the very volatile ether is probably incurred. The 5 per cent. solution appears to represent the best samples of sweet spirit of nitre obtainable in the shops of London.

The author called attention to the convenience of obtaining solutions of very volatile liquids of definite strength by the method indicated, viz., by absorbing the gases in a known weight of alcohol, and mentions beside nitrite of ethyl, which boils at about 61°F., nitrite of methyl (boiling point 17°F.=·12°C.) and chloride of ethyl (boiling point 12·5°C.=54·5°F.) He likewise suggested that the preparation of the pure nitrite of ethyl was the only correct method for obtaining spirit of nitre of definite strength.

Professor Attfield alluded to the difficulty in assaying spirit of nitre; in estimating its value he had found it necessary to isolate the pure nitrite of ethyl, and often from 12 to 20 fractional distillations would be necessary. The present official (British) process would yield a spirit of five per cent. strength or less; even if all the nitric acid ordered was converted into nitrite of ethyl, it would only be of 7 or 7½ per cent. strength If aldehyd be present in the spirit, it would likewise, at least

to some extent, be separated with the nitrite of ethyl. Regarding pure nitrite of ethyl, the speaker hoped that it would not be demanded of pharmacists, and considered it extremely undesirable the public should have undiluted chemical principles of such great activity and danger placed in their hands.

Mr. R. H. Davies, in preparing nitrite of ethyl had generated nitrous acid from nitric acid and arsenic, and followed Liebig's process, of which Mr. Williams' is an improvement. He had observed a separation of about 5 per cent. from an alcoholic solution containing 10 per cent. of commercial pure aldehyd, on being treated with solution of calcium chloride.

Mr. Umney had worked with the Pharmacopœia process on a large scale, having never less than four gallons of spirit in the still, and met with no difficulty in obtaining a concentrated solution of hyponitrous ether by that process. Working with such quantities some extra attention is required to moderate the action.

Prof. Redwood had also seen the process worked for many years in quantities quite as large as those mentioned. The distillate would, with solution of calcium chloride, separate from 38 to 40 per cent. of etherial liquid, probably about one-half of which was nitrite of ethyl. He felt that the process which he had been the means of introducing, was the only known process of producing sweet spirit of nitre of a tolerably definite composition.

Mr. Williams stated that his paper referred not to spirit of nitre, but to solutions of pure nitrite of ethyl in absolute alcohol. Aldehyd usually contains acetic ether and acetone; pure aldehyd would not separate with chloride of calcium.

The color of podophyllum resin was the title of a paper presented by Dr. A. Senier and A. J. G. Lowe. The authors observed that the color of the resin is affected by the relative proportion of water, an increase of which renders it lighter and more yellowish, and that hot water darkens the resin by partial fusion. The authors found several samples to be free from alkaloid. Alum water gives a bright yellow resin and increases the ash; prepared with water or acidulated water, only ·1 per cent. of ash was found; in 8 commercial samples it varied between ·2 and 4·1 per cent. The authors conclude that the variations of shade and color do not affect the physiological activity of the resin.

Mr. Martindale thought that the part of podophyllum resin insoluble in ether was of a bright-yellow color,[1] and would partly account for the difference of color.

Mr. Harold Senier read a paper on *Rheum officinale grown in England.* The root yields a brighter powder than East Indian rhubarb and Rheum rhaponticum, and also a slightly darker infusion. By the officinal process for extract of rhubarb it yielded 25, the others 45 and 29 per cent. respectively. By rectified spirit 17, 38 and 21 per cent. of extract was obtained, and this yield is regarded as a more reliable basis for comparison. The three kinds yielded 4·66, 12·72 and 7·9 per cent. of ash. The results point to the conclusion that the root of Rheum officinale is of less commercial value than that of Rh. rhaponticum, and are what one might expect from the rapid growth of the root, this particular sample being produced in about three years. The extract was found to be decidedly cathartic in 10 grain doses.

False Angostura Bark and Brucia. By W. A. Shenstone.—The author found the

[1] This does not agree with our observation. See also "Am. Jour. Phar.," 1877, p. 549 —EDITOR.

bark (of Strychnos nux vomica) to contain strychnia, though only in small quantities. The following provisional process has been adopted for proving its presence in brucia: About ·5 grm. of this is placed in a test-tube, with 3 or 4 cc. of 5 per. cent. nitric acid, and warmed gradually by immersion in hot water; when yellow crystals of cacothelin make their appearance, potassa solution is added in excess, and the solution cooled by placing in cold water; it is then extracted by agitation with chloroform, this solution evaporated and the residue tested in the usual way. When the amount of strychnia is small, it is necessary to char the residue with sulphuric acid before testing it, as the chloroform usually extracts a small quantity of a resinous substance which masked the reaction of the strychnia. The author also observed that brucia seems to undergo alteration by heating with pure, slightly acid or alkaline water, and intends to investigate the products produced.

Russian turpentine oil was found, by Dr. W. A. Tilden, to have the spec grav. ·8682 at 15°C., to be dextrogyre and to consist of a liquid having the same composition and properties as common turpentine oil, but of a stronger action on polarized light; of a liquid having the same composition, but boiling at about 171–5°C., and of some high boiling hydrocarbons, polymeric with turpentine oil.

Oleum foliorum pini sylvestris, examined by the same author, was of ·8756 spec. grav. at 12°C., to be detrogyre and to commence to boil below 100°C. It consists of a liquid boiling at 156 to 159° which is almost certainly identical with common turpentine oil; and of a liquid boiling between 171 and 176°C., which has nearly the same odor as the chief terpene of the Russian turpentine, but is lævorotatory.

The use of Russian turpentine oil was recommended by Mr. A. W. Postans in liniments and other preparations in place of the common turpentine oil, on account of its agreeable, attractive and aromatic odor and its by no means unpleasant taste.

EDITORIAL DEPARTMENT.

Physicians as Dispensers, is the title of several communications which have recently appeared in the "Philadelphia Medical and Surgical Reporter," and were initiated by a communication from J. W. P. Bates, M.D., to the Medical and Surgical Society of Baltimore, published by our cotemporary, November 10. The first portion of this paper is a reproduction of the same charges against "druggists" as were preferred in the same society five years ago (see "Amer. Jour. Phar.," 1873, p. 88), with this addition, that, "if the medicine (prescribed by a physician) proves to be a very efficient combination and have some local reputation, the druggist will keep it always prepared and labeled with his own name." Further on, the "druggist" is accused of charging exorbitantly for the medicines, and the danger resulting for the general practitioner from the inroads of homœopathy are alluded to, the success of which is attributed to the pleasantness of its medicines (? Editor) and that there is no "drug bill" to pay, since the homœopath furnishes the medicines himself. For all this Dr. Bates can see but one remedy, namely, to furnish, as far as possible his own medicines, and, to carry out this idea, suggests that the wholesale druggist manufacture all the available articles of the materia medica in mini-

mum doses, in granules. The intent and purpose of the paper is summarized in the following concluding paragraph:

To illustrate: say we have granules of a quarter of a grain of hyoscyamus, an eighth of a grain of nux vomica, half a grain of quinia, and half a grain of iron. If we wished to put up the following prescription—

℞	Quiniæ sulph., ...	grs. ii
	Ferri citrat., ...	gr. i
	Ext. hyoscyami, ...	gr. ss
	Ext. nucis vom., ...	gr. ¼

we would use four granules of the first, two of the second, two of the third and two of the fourth, put them in a powder paper, and the dose would be ready for administration. The number of granules in a dose would make no difference, and the combination would be entirely in our own hands, and could not be repeated without our knowledge and consent. The objection to this might be the cost to the physician. True, he would lose on the first prescription; instead of making a dollar, he would clear only seventy-five cents; but then we should remember that for every time it is repeated he would get the money, and not the druggist; that the paper could not be loaned to all the neighbors; that you are not telling everybody the secrets of your business as you now do; and that the satisfaction to the community would be greater, as the medicine would be at hand, and no drug bills.

Regarding the *charges* preferred against apothecaries, they must be looked upon as chronic complaints on the part of certain individuals, who delight in speaking in general terms of the usurpation and the unscrupulousness of the former, and fail to see that the shortcomings of one or a few are not chargeable to the many. That some physicians are guilty of unscrupulous and dishonest practices and of unprofessional conduct is no secret; yet who would accuse the whole profession of the offences and crimes of the minority?

Regarding the proposed *remedy*, if carried out, it would doubtless be hailed with the utmost satisfaction by the manufacturers of medicinal specialties, the number of which would still more rapidly increase than they have done in the past under the fostering care of physicians, who are following the plan now proposed to be universally extended. As to the final result we have no fear, and are convinced that the intelligent public would prefer the "drug bills" to the "dispensations of physicians." In our opinion, the surest way to secure reform is to encourage professional integrity.

Chloriastos is the name proposed by a correspondent of the "Dublin Medical Press and Circular," Oct. 17, for a saturated solution of chloride of lead, recommended by Dr. Goolden as a disinfectant. And the reason for thus baptizing the solution? Merely to secure its use!

Pharmaceutical Meetings.—Many local pharmaceutical societies in this and other countries hold meetings at regular, usually monthly, intervals, at which scientific and practical observations connected with pharmacy are discussed. Such discussions are often of considerable merit and importance, and a resumé thereof, in many cases deserves to become more widely known. Colleges of pharmacy, at which such meetings are held, are invited to send accounts thereof to the editor, for publication in the "Journal."

While these meetings give to the pharmacists an opportunity of exchanging their views on many subjects, the younger members of the profession and the students frequently profit by listening to the discussions without actively participating therein. Their opportunity for comparing notes is mostly restricted to the students' societies, of which two—a junior and a senior—have been organized at the Philadelphia College of Pharmacy, and are doubtless in existence at other institutions. More recently efforts have been made to induce these younger men to scientific researches and close observations outside of the subjects more immediately connected with their studies, such as the quarterly meetings of the Alumni Association of the New York College of Pharmacy and the monthly social and conversational meetings of the Alumni Association of the Philadelphia College of Pharmacy. We commend these meetings to all who value habits of attentive observation and recognize the importance of judicious training in such habits.

OBITUARY.

MARSHALL SPRING BIDWELL died at Elmira, N. Y., Nov. 21, 1877, after a long illness and decline, being then in the forty-third year of his age. He was born in Toronto, Canada, but his parents moving to New York city, he was educated there and graduated at Columbia College in 1856. His health failing, he remained for ten years in the country in Western Massachusetts, and during this time, from being treated with preparations of silver, his face acquired a blueish-grey tint, which it permanently retained. In 1868 he commenced business at Sheffield, Mass, and in 1872 moved to Elmira, having purchased the store of Owen & Morse

The deceased was a fine scholar, an upright and amiable man and a warm and devoted friend.

CATALOGUE
OF THE
Class of the Philadelphia College of Pharmacy,

For the Fifty-seventh Session, 1877-8.

WITH A LIST OF THEIR PRECEPTORS AND LOCALITIES.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Aaron, James Polk,	Hollidaysburg,	Pa.	Frank H. West.
Albright, Franklin Pierce,	Allentown,	Pa.	Van Buskirk & Apple.
Alleman, Emanuel, Alison,	Milton,	Pa.	W. C. Bakes
Allen, Alexander Bonnell,	Flemington,	N. J.	C C. McGlaughlin, M.D.
Allen, Jno. Hays, Jr.	Montoursville,	Pa.	
Allen, Jno. Reese,	Wilmington.	Del.	James Kemble.
Allen, Joseph Ingersol,	Gloucester City,	N. J.	Edwin Tomlinson.
Ancker, Louis,	Charleston,	S. C.	Geo. W. Notson.
Angier, James Watson,	Darby.	Pa.	Wardle Ellis.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Ashmead, Alfred C.	Philadelphia,	Pa.	Albert L. Helmbold.
Bache, Benjamin Franklin,	Bristol,	Pa.	Bullock & Crenshaw.
Bancroft, Geo. Hickman,	Philadelphia,	Pa.	R. W. Cuthbert.
Barnitz, Jno. Stevenson,	Chambersburg,	Pa.	A. J. Miller.
Bartlett, Walter Edward,	Philadelphia,	Pa.	Newbold Bros.
Barton, Charles Edwin,	Cleveland,	Ohio.	W. W. Moorhead.
Bassett, Fenwick,	Salem,	N. J.	James T. Shinn.
Beale, Charles,	Philadelphia,	Pa.	Edmond Beale, M.D.
Beavis, Wm. Henry,	Cleveland,	Ohio.	Henry Mueller.
Beetem, Jacob Samuel,	Carlisle,	Pa.	S. S. Bunting.
Belleville, Allen Leslie,	Delaware City,	Del.	A. W. Test.
Bellows, Charles Edward,	Bridgetown,	N. J.	Wm. Notson, M.D.
Bennett, Jno. Knight,	Vincentown,	N. J.	F. S. Hilliard.
Berger, Charles Edward,	Catasauqua,	Pa.	W. A. Heckenberger.
Betz, Herman,	Burlington,	Iowa.	C. P. Squires & Co.
Beyer, Jno. Jacob,	Philadelphia,	Pa.	A. F. Vogelbach.
Bicker, Francis Joseph,	Philadelphia,	Pa.	W. B. Bicker
Biddle, Richard,	Philadelphia,	Pa.	
Bidwell, Edwin Hugh,	Vineland,	N. J.	E. C. Bidwell, M.D.
Bigelow Israel, Jr.	Dubuque,	Iowa.	T. W. Ruete.
Blackstone, Thomas Wise,	Drummondtown,	Va.	
Blankenhorn, Jno.	Poughkeepsie,	N. Y.	Wood & Tittamer.
Bobb, Wallace Geary,	Philadelphia,	Pa.	V. H. Smith & Co.
Brakeley, Joseph,	Bordentown,	N. J.	George I. McKelway.
Bourn, Dudley Leo.	Quincy,	Ill.	Thadeus Everhard.
Brown, George Walbridge,	Jamestown,	N. Y.	A L. Helmbold.
Brown, Thomas Trew,	Chestertown,	Md.	Jno. Wyeth & Bro.
Brunner, Norman Isaac,	Macon,	Ga.	S. D. Everett.
Bullock, Lawrence Minor,	Jacobstown,	N. J.	Wm. Procter, Jr. Co.
Burns, Seymour Snowden,	Minersville,	Pa.	W. A. Cantrell.
Button, Charles Edwin,	Chillicothe,	Mo.	Samuel F Boyce.
Cahoon, Charles Thomas,	Media,	Pa.	Wm. H. Wallace.
Campbell, Henry Moffitt,	Philadelphia,	Pa.	A. F. Stull.
Carpenter, Frederick White,	Poughkeepsie,	N. Y.	Wood & Tittamer.
Carslake, Wm. Henry,	Bordentown,	N. J.	G. W. Carslake.
Castleton, Edward Ligon,	Houston,	Texas.	R. Cotter.
Caterson, Wm. Henry,	Philadelphia,	Pa.	Wm. M. Caterson, M.D.
Chabot, Wash. Jackson,	Philadelphia,	Pa.	Jno. W. Wirgman.
Chapman, Richard Alex.	Shermer,	Texas.	Lemoyne & Haley.
Clapham, Hesser Charles,	Mifflinburg,	Pa.	J. A. Milliac.
Cochran, Alfred William,	Camden,	N. J.	Samuel W. Cochran.
Costelo, David,	Indianapolis,	Ind.	Geo. F. Traub & Co.
Cox, Harry,	Philadelphia,	Pa.	Wm. E. Lee.
Cox, Harry Oscar,	Cloucester City,	N. J.	Duncan Blake, M.D.
Craig, Thomas Canby,	Chambersburg,	Pa.	W. D. Robinson.
Craighead, Thomas,	Philadelphia,	Pa.	Geo. S. Craighead.
Crane, Henry Bedell,	Newton,	N. J.	H. H. Ross.
Cravens, Harry Otis,	Dallas,	Texas.	T. A. Andrews, M.D.
Crawford, Walter,	Nazareth,	Pa.	Geo W. Dougherty.
Crenshaw, Edmund Anton, Jr.	Philadelphia,	Pa.	Bullock & Crenshaw.
Cribbs, James M.	Homer City,	Pa.	J. R. Stevenson, M.D.
Curran, John P., Jr.	Philadelphia,	Pa.	A. Hohl.
Curtis, Frank Alfred,	Cochranton,	Pa.	
Custis, Daniel Parke,	Tallahassee,	Florida.	
Dare, Charles Wm.	Troy,	Pa.	B. B. Mitchell.
Davies, Chas. Sumner,	Philadelphia,	Pa.	McKeown, Bower & Ellis.
Davis, Isaac,	Philadelphia,	Pa.	Geo. H. Davis.
Davis, Marshall Moses Andre,	Philadelphia.	Pa.	F. E. Himmelwright.
Davis, Nehemiah,	Smyrna,	Del.	Jno. R. Haney, M.D.
Davy, George Wm.	Philadelphia,	Pa.	Bullock & Crenshaw.
Deacon, Geo. Frank,	Bordentown,	N. J.	Bunting Hankins.
Dean, Norman R.	Attleborough,	Pa.	Israel J. Grahame.
Deprez, Wm. Henry,	Shelbyville,	Ind.	Jacob Weingarth.
Dibert, Josiah Henry,	Bedford,	Pa.	H. Heckerman & Son.
Diehl, Benjamin Harper,	Quakertown,	Pa.	Levi K. Slifer, M.D.
Dinges, Robert Pitcairn,	Lock Haven,	Pa.	Wm. H. Hickman.
Drake, Theodore,	Bethlehem,	N. J.	J. M. Higgins, M.D.
Eckels, Geo. Morris,	Mechanicsburg,	Pa.	A. B. Wenrich.
Eyler, Maurice Edgar,	Waynesboro,	Pa.	H. C. Blair's Sons.
Eyre, Clarence Preston,	Woodbury,	N. J.	Jno. Wyeth & Bro.
Fahnestock, Levi,	Pittsburg,	Pa.	B. L. Fahnestock & Co.
Falck, Jno. Aiken,	Lancaster,	Pa.	Robert C. Snarp.
Farnsworth, Jas. Tarring,	Lock Haven,	Pa.	D. Farnsworth & Bro.
Farwell, Charles Darius,	Weathersfield,	Vermont,	C. W. Peck, M.D.
Fawkes, David Wilmot,	Wilmington,	Del.	Z. James Belt.
Federer, Ernest Charles,	Sandusky,	Ohio.	M. Eisner.
Feil, Joseph,	Cleveland,	Ohio.	P. Fitch, M.D.

Matriculants.	Town or County.	State.	Preceptor.
Fleming, Wm. Scott,	Greencastle,	Pa.	Ch. L. Mitchell.
Flowers, Hiland,	Gettysburg,	Pa.	A. D. Buehler.
Forbes, Wm. Henry, M.D.	Indianapolis,	Ind.	J S. Forbes, M.D.
Fosselman, Charles,	Emporia,	Kan.	J. W. Read.
Foster, Wm. Malcolm,	Honedale,	Pa.	C. C. Jadwin.
Freas, Wm. Kerr,	Norristown,	Pa.	Wm. Stahler.
Frederick, John Henry,	Allentown,	Pa.	W. C. Bakes.
French, Charles Stanley,	Camden,	N. J.	French, Richards & Co.
French, Harry Banks,	Philadelphia,	Pa.	French, Richards & Co.
Frey, Andrew G.	Mountville,	Pa.	A. Lineweaver.
Gadd, Samuel Wesley,		England.	S. Creadick, M.D.
Gahn, Henrie,	Upsala,	Sweden.	Jno. Wyeth & Bro.
Garcia, Amado de Jesus,	Santiago,	Cuba.	A. J. Schick.
Gardner, Charles Herman,	Spruce Creek,	Pa.	J. P. Remington.
Gerhard, Wm. H.	Philadelphia.	Pa.	R Shoemaker & Co.
Graham, James Lord,	Camden,	Del.	S. D. Marshall, M.D.
Gray, Geo. Washington,	Philadelphia,	Pa.	Isaac Tull.
Graybill, Peter,	Annville,	Pa.	G. A. Bachman, M.D.
Griffin, Edwin Clarence,	Niles,	Mich.	Stevens & Belknap.
Gross, Percival Franklin,	Allentown,	Pa.	C. C. Klump.
Gubbins, Charles Henry,	Vineland,	N. J.	S. T. Jones
Hall, Harry Augustus,	Danville,	Ill.	J. A. Hall, M.D.
Hallam, Daniel,	Gloucester City,	N. J.	Thomas Hallam.
Hammer, Edwin Howard,	Cleveland,	Ohio.	Daniel S. Jones.
Hano, Simon Louis,	Philadelphia,	Pa.	C. H. Brutton, M.D.
Haring, Henry Gettman,	Quakertown,	Pa.	Wm. N Bowen.
Harker, Frank Scott,	Hampton,	Va.	C. N. Wills.
Harmanson, John Henry,	Pungoteague,	Va.	James Bluffworth.
Harrison, Jno. Windham,	Wheeling,	Va.	Logan, List & Co.
Harrold, Charles Albert,	Washington,	D. C.	F. Brown.
Hart, George Franklin,	Williamsport,	Pa.	Louis Dembinski.
Hayhurst, Susan,	Philadelphia,	Pa.	
Hendricks, Elwood Gouldy,	Centre Point,	Pa.	Wm K. Mattern.
Henry, George Wm	Camden,	N. J.	Winfield S. Plank.
Hetrick, Dick Russel,	Indiana,	Pa.	Delos Hetrick.
Higgate, Wilford Oldham,	Philadelphia,	Pa.	Wm. B. Webb.
Higgins, Charles Austin,	Flemington,	N. J.	J. F. Hayes.
Hilton, George Perry,	Belvidere,	N. J.	R. A. Boyd.
Hoell, Conrad Gabriel,	Camden,	N. J.	T. G. Rowand, M.D.
Hoguet, Wm.	Bristol,	Pa.	L. A. Hoguet.
Horner, James W.	Stratford,	Canada.	H. Blithe.
Hudgin, Edward Lee,	Galesburg,	Ill.	Wm. Trinder.
Hull, Morris Albert,	Philadelphia,	Pa.	Samuel W. Brown.
Humrich, Wm. Beetem,	Carlisle,	Pa.	H. C. Blair's Sons & Co.
Hurley, David George,	Lebanon,	Pa.	Jos. L Lemberger.
Jacobs, Joseph,	Athens,	Georgia,	R. T. Brumby & Co.
Johnson, John George,	Minneapolis,	Minn.	T. K. Gray & Co.
Jones, Isaac Penrose,	Williamsport,	Pa.	L. A. Dix, M.D.
Jones, Roland Davis,	Milton,	Del.	C. B. Lowe.
Jungmann, Emil,	Heidelberg,	Germany,	Chas. C. Spannagel.
Kain, Wm. Wilkins,	Camden,	N. J.	Herman W. Miller.
Kays, Loran Dewey,	Scranton,	Pa.	Chas. Henwood.
Keeney, Wm. Reynolds,	Philadelphia,	Pa.	C. R. Keeney.
Kelly, Patrick Mulcany, M.D.		Ireland.	
Kemble, Robert Hayes,	Mifflinsburg,	Pa.	J. I. Weaver.
Kern, James Pecor,	Phliadelphia,	Pa	A. H. Yarnall.
Kernan, Jos. Halbert,	Carlisle,	Pa.	T. J. Husband, Jr.
Kernan, Thos. Edward Barron,	Philadelphia,	Pa.	McKelway & Borell.
Keys, Thomas Franklin,	Philadelphia,	Pa.	R. Keys, M.D.
King, George Henry,	Belvidere,	N. J.	A. G. Smith.
Klemet, John,	Philadelphia,	Pa.	Wm. Klemet.
Koehler, Franklin,	Philadelphia,	Pa.	William Bell.
Kohlerman, Jno Wm.	Wilmington,	Del.	A. Nebeker, M.D.
Koons, Wm. Harland,	Coatesville,	Pa.	J. Garman, M.D.
Kratz, Mahlon,	Hilltown,	Pa.	A. J. Shick.
Kroeg, Andrew Alex.	Charleston,	S. C.	G. J. Luhn.
Krogman, Jos. Francis,	Philadelphia,	Pa.	Benj. Falkenburg.
Krout, Albert,	York,	Pa.	J. T. Hoskinson, Jr.
Lawall, Henry Clarence,	Catasauqua,	Pa.	Jacob S. Lawall.
Lehman, Jno. Wesley,	Barren Hill,	Pa.	W. R. Warner.
Lentz, Charles Wm.	Lehighton,	Pa.	Chas. L. Mitchell.
Lerchen, Herman,	Davenport,	Iowa.	Gustavus Schlegel.
Levering, Howard Malcolm,	Manayunk,	Pa.	W C. Todd, M.D.
Levi, Alexander Benjamin,	Philadelphia,	Pa.	C. C. Hughes
Lilly, Charles Foster,	York,	Pa.	Samuel Campbell.
Lins, Jno. Allen,	Allentown,	Pa.	F. P. Lins.
Lits, Walter Kulp,	Frankford,	Pa.	J. Frank Wilgus.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Llewellyn, John,	Johnstown,	Pa.	P. P. Fox.
Lloyd, Evan Davis,	Pittsburg,	Pa,	M. M. Schneider.
Lock, John Herman,	Philadelphia,	Pa.	L. W. Hildebrand.
Longaker, Daniel,	Schwe ksville,	Pa.	Jno. Gilbert & Co.
Loper, Lorenzo Dow,	Bridgeton,	N. J.	Christopher Petzelt.
Love, Louis Francis,	Philadelphia,	Pa.	A. B. Taylor
McComas, Chas. Edgar,	Hagerstown,	Md.	Jas. G. Wells.
McCullogh, Clement,	Oxford,	Pa.	M Lovett.
McFadden, Eugene Anson,	Hollidaysburg,	Pa.	S. C. Snyder & Son.
McFeeters, Andrew J.	Philadelphia,	Pa.	W R. Warner & Co.
Mackenson, A'onzo Geo.	Middletown,	Pa.	Jno. W. Rewalt.
McKinley, Wm. Samuel Morrison,	Philadelphia,	Pa.	
Maguire, Jno. Hunter,	Philadelphia,	Pa.	
Maier, John,	Bridesburg,	Pa.	C. H. Lambert, M.D.
Malloch, Jno	Philadelphia,	Pa.	L. Murjahn.
Mann, George Wagner,	Chester,	Pa.	W. W. Johnson, M.D.
Marley, Richard Cordeleon,	Newark,	Del.	
Matthews, Albert Hudson.	Bethel,	N J.	W. L. Matthews, M.D.
Meade, Julian Franklin,	Philadelphia,	Pa.	Samuel Beidler.
Megill, Watson,	Owensboro,	Ky.	Henry Megill, M.D.
Miller, David Patrick,	Lynchburg,	Va.	Lumsden & Hamner.
Millington, Jos. Thomas,	St. Clair,	Pa.	A. P. Carr, M.D.
Mitchell, Jacob Myers, Jr.	Salem,	N. J.	J. B. McElroy.
Mittelbach, Wm.	Booneville,	Mo.	E. Roeschel.
Moffatt, Walter Ely,	Perryville,	Ind.	Thos. C. Van Nuys, M.D.
Moffet, David	Philadelphia,	Pa.	Jno. Moffet.
Morgan, James Hamilton,	Wilmington,	Del.	
Morrison, Charles,	Shelbyville,	Ind.	Jno. H. Leefers.
Moser, Jno. Hendricks,	Norristown,	Pa.	A. R. Slemmer.
Mossberg, Jno. Frederick,	Carlstad,	Sweden.	Samuel Campbell.
Menger, Edward Frederick,	Crete,	Neb.	Alex. Kennedy.
Mullins, Michael Martin Ambrose,	Gloucester City,	N. J.	Michael Mullins.
Murray, Bayard,	Philadelphia,	Pa.	R. Shoemaker & Co.
Murray, Bernard James,	Philadelphia,	Pa.	Geo. V Eddy.
Musser, Omar Henry,	Lancaster,	Pa.	J. T. Shinn.
Myers, Clayton Ricker,	Mount Joy,	Pa.	Thos. R. Coombe.
Neppach, Peter Frederick,	Portland,	Oregon.	S. A. Neppach.
Newcomer, Edward Jacobs.	Culpeper,	Va.	J. B. Gorrell.
Noss, Henry,	Norwich,	Conn.	R. F. W. Opperman.
Oberholtzer, Jno. Vanderslice,	Philadelphia,	Pa.	Levi Oberholtzer.
Orsell, Jacob Francis, Jr.	Conshohocken,	Pa.	James Van Court.
Ott, Emile,	Philadelphia,	Pa.	Gust. Krause
Owens, Samuel,	Ashland,	Pa.	W. Owens, M.D.
Packer, Geo. Harmon,	Beverly,	N. J.	H. C. Van Meter.
Patterson, Wm. Renick,	Hillsborough,	Ohio.	Chas Shivers.
Payne, Geo. Alex. Woodson,	Lynchburg,	Va.	Geo. P Craighill & Co.
Peat, Edward,	Delphos,	Ohio.	W. C. Bakes.
Pechin, Wm. Joseph,	Philadelphia,	Pa.	F. C. Clemson.
Pennypacker, Nathan,	Chester county,	Pa.	S. Mason McCollin.
Peters, Horatio Gates,	New Oxford,	Pa	T. V. S. Quigley, M.D.
Phillips, Thos Jefferson Woodworth,	Deerfield,	N. J.	J. L. Bispham.
Pleibel, Frederick, Jr.	Philadelphia.	Pa.	F. Pleibel, M.D.
Plumer, Wm. S., Jr.	Columbia,	S. C.	L. T. Silliman.
Podolski, Louis Adolph.	Philadelphia,	Pa.	Geo. C. Evans.
Porter, Geo. Cooper,	Kennett Square,	Pa.	T. W. Taylor, M.D.
Porterfield, Wm. Perry,	Falling Waters,	W. Va.	H. C. Blair's Sons & Co.
Prall, Delber Elwyn,	East Saginaw,	Mich.	E. B. Garrigues & Co.
Raab, Ernst Philip,	Belleville,	Ill.	A. W. Miller.
Radley, Aaron Wm.	Easton,	Pa.	E. D. Ritter.
Reche, Henry Charles,	Dubuque,	Iowa.	
Reed, Willoughby Henry,	Phœnixville,	Pa.	I. M. Buckwalter.
Reeve, Walter Sharpless,	Medford,	N. J.	Henry P. Thorn.
Reichard, Chas. Wolf,	Wilkesbarre,	Pa.	Jno. Wyeth & Bro.
Reimann, George,	Buffalo,	N. Y.	L. P. Reimann.
Reinecke, Ernest Wm.	Pittsburg,	Pa,	Jos. W. Stenger.
Resag Charles Edward,	Wilmington,	Del.	E. McInall, Jr.
Retel, Michael,	Buffaio,	N. Y.	Peter H. Davis,
Richards, Alfred Nathan,	Easton,	Pa.	Dr. J. A. Hanly.
Roberts, Charles Haines,	Atlantic City,	N. J.	Wm. Wright.
Roberts, Charles Henry,	Philadelphia,	Pa.	I. R. Landis.
Roberts, Victor Christopher,	Salem,	N. J.	Chas. W. Warrington.
Robinson, Samuel E.	McConnelsburg,	Pa.	W. D. Robinson.
Roche, Edward Manning, Jr.	Philadelphia,	Pa.	E. M. Roche.
Rosenthal, Edwin,	Philadelphia,	Pa.	
Ross, Augustus H.	Camden,	N. J.	Jas. S. Everton.
Ross, David Hambleton,	Philadelphia,	Pa.	Bullock & Crenshaw.
Saalfrank, Charles Wm.	Philadelphia,	Pa.	O. L. Coles.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Sample, George Wm.	York,	Pa.	C. R. Haig.
Schandein, Harry,	Philadelphia,	Pa.	Jas. B. Weaver.
Schimminger, George Wm.	Philadelphia,	Pa.	J. W. Dallam.
Schlosser, Gerhard,	Baden,	Germany.	Wm J. Shaeffer.
Selinger, John Anthony,	Pottstown,	Pa.	Jno. Oddy, M.D.
Shull, David Franklin,	Mainfield,	Ohio.	B. M. Magill.
Siglinger, Charles Jacob,	Philadelphia,	Pa.	H. A. Godshalk.
Simpson, S. Moses,	Dayton,	Ohio.	Thomas Dover.
Sitler, Alpheus,	Harmony,	Pa.	
Slough, Chas. Edward,	Allentown,	Pa.	C. K. Christman & Co.
Smedley, Harry Leedom,	Media,	Pa.	A. H. Yarnall & Co.
Smeltzer, Jacob Daniel,	Croskill Mills,	Pa.	P. M. Ziegler.
Smith, Augustus Swartz,	S. Bethlehem,	Pa.	Valentine H Smith & Co.
Smith, Frank Roop,	Wilmington,	Del.	N. B Danforth, Ph.G.
Smith, George Henry,	Allentown,	Pa.	Jos B Shaw.
Smith, Wm. Harrold.	Philadelphia,	Pa.	W. R. Warner & Co.
Sparks, Alfred Denney,	Smyrna,	Del.	T. M. Baldwin.
Sparks, James Mitchell,	Fort Smith,	Ark.	N. D. Woods.
Speaker, George,	Chestnut Hill,	Pa.	Wm. A. Whittem.
Spenceley, Cornelius Ederson,	Philadelphia,	Pa.	A. H. Yarnall & Co.
Spencer, Wm.	Carlisle,	Pa.	H. C Blair's Sons.
Sprissler, Theodore Joseph,	Philadelphia,	Pa.	I. M. Thomas.
Staples, Byron, Elwood,	Jersey Shore,	Pa.	A. B. Taylor.
Starck, Albert August Gustav,	Danville,	Ill.	W. W. W. Woodbury, M.D.
Sterner, Oliver Henry,	Allentown,	Pa.	W. H. Rinker.
Stevenson, Chas. R.	Atchison,	Kan.	Simonds & McConaughy.
Stites, Albert Harvey,	Millerstown,	Pa.	S. P. Thatcher.
Stollenwerk, Chas.	Greensboro,	Ala.	A. Stollenwerck.
Strickler, Jacob,	N. Bloomfield,	Pa.	M. B. Strickler, M.D.
Strunk, Samuel W.	Quakertown,	Pa.	Stephen F. Penrose.
Suess, Paul Jno.	S. Bethlehem,	Pa.	Jno. N. Shoffner.
Sweitzer, Morris Kemerer,	Bethlehem,	Pa.	S. E. R. Hassinger.
Talbot, Stephen Liversidge,	Boston,	Mass.	R. F. Fairthorne.
Thomas, Emil Conrad,	Philadelphia,	Pa.	Jno. Knorr.
Thorp, Alexander Proudfit,	Rocky Mount,	N. C	H. R. Thorp, M.D.
Titcomb, Jos. Alexander,	Columbia,	Tenn.	Titcomb & Fowler.
Trimble, Frank Fremont,	Salem,	Ohio.	R. P. Trimble.
Troll, Conrad Wm.	St. Clairsville,	Ohio.	J. B. Hoge.
Turner, Alexander,	Philadelphia,	Pa.	W. L. Turner.
Turner, Curtis Waugh,	Philadelphia,	Pa.	F. S. Boisnot.
Turner, Jno. Basketter,	Philadelphia,	Pa.	R. Reed Stewart, Ph.G.
Uhland, Jno. Augustus,	Lebanon,	Pa.	Dr. Geo Ross & Co.
Vansant, Robert Hays,	Trenton,	N. J.	Henry B. Chumar.
Vowell, Louis Sweitzer,	Washington,	Pa.	W. D. Roberts.
Wade, McClanahan,	Christiansburg,	Va.	J. E. Waddell.
Wagener, Charles Hugh,	Holmesburg,	Va.	T. C. Orth.
Wallace, Wm. Sampson,	Newark,	Ohio.	Hugh Campbell.
Wallington, Edward Morrell,	Trenton,	N. J.	Randal Richey.
Warrington, Edward,	Morristown,	N. J.	Charles Warrington.
Waterland, Samuel,	Cleveland,	Ohio.	A. Mayell.
Waterman, Benj. Carpenter,	Eugene,	Ind.	A. M. Burden, M.D.
Watson, Charles Wesley,	Cochranville,	Pa.	L. M. Pratt, M.D.
Weis, William,	Reading,	Pa.	Jules Muringer.
Wendel, William,	Frankfort,	Germany.	W. L. Wittcamp.
Werckshagen, Otto,	Philadelphia,	Pa.	C. A. Werckshagen.
Wessels, Jno. Louis,	Pittsburg	Pa.	T. C. Lange.
White, Andrew Allison,	Philadelphia,	Pa.	Bullock & Crenshaw.
White, Delaware Meigs,	Wilmington,	Del.	B. Downs, M D.
Whitehill, George Wm.	Marietta,	Pa.	Henry N. Bryan.
Whiteside, Wm. Elder,	Philadelphia,	Pa.	P. S. P. Whiteside.
Whitney, Henry Clay,	Glassborough,	N. J.	G. Krause.
Wicks, Milton Barton	Lancaster,	Pa.	
Widdicombe, Thos. C.	Philadelphia,	Pa.	J. M. Wirgman.
Williams, Frederick Tyacke,	Bethlehem,	Pa.	Hugh H. Ross.
Wilson, Thomas Winfield,	Wilkesbarre,	Pa.	Thomas Hunter.
Wilson, Wm. Rufus,	Philadelphia,	Pa.	C. W. Seary, M.D.
Wingert, Joseph Vincent,	Pottsville,	Pa.	F. C. Clemson.
Wolf, Francis Xavier,	Reading,	Pa.	J H. Stein.
Wolf, Louis,	Louisville,	Ky.	J. T. Shinn.
Woodnutt, Wm. Warren,	Salem,	N. J.	Bullock & Crenshaw.
Woods, Jno. Charles,	Danville,	Ill.	Jas. N. Marks.
Woolsey, Jno. Richard,	Rochester,	N. Y.	D. G. Weare, M.D.
Zaegel, Max Robert,	Sheboygan,	Wis.	J. A. Heintzelman.
Zaun, Henry,	Philadelphia,	Pa.	W. W. Moorhead.
Zeller, Chas. Frederick,	Philadelphia,	Pa.	Jos. P. Remington.
Ziebach, Edwin Robert,	Lebanon,	Pa.	J. A. Armstrong, M.D.